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# TRANSACTIONS

OF THE

# INTERNATIONAL MEDICAL CONGRESS.

## NINTH SESSION.

EDITED FOR THE EXECUTIVE COMMITTEE

BY

JOHN B. HAMILTON, M. D.,
Secretary-general.

VOLUME II.

WASHINGTON, D. C., U. S. A.
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# ERRATA—VOLUME II.

*Page 22.* German title, for "hygiänischen" read hygienischen.

*Page 81.* French title, change so that it will read Sur les Demandes Modernes des Hôpitaux Mobiles et Stationaire dans la guerre.

*Page 88.* French title, for "Aisement" read Aisément; for "Temporellement" read Temporaire.

*Page 91.* French title, for "Doivent" read Doive.

*Page 99.* French title, for "L'Acclimation" read L'Acclimatation, Des Soldats.

*Page 115.* Paragraph 4, fifth line, for "déterminent de la dyspepsie" read déterminent la dyspepsie. In conclusion of second part, paragraph 7, for "servitudes" read serviture; for "de fonds" read des fosses.

*Page 180.* German title, for "Gelnke" read Gelenke.

*Page 187* German title, for "ungefährliche" read nicht-tödtliche.

*Page 265.* French title, erase the word ultérieure.

*Page 268.* French title, for "Suprérorité" read Supériorite.

*Page 323.* French title, for "Pour" read Par.

*Page 328.* German title, for "Zangen" read Zange.

*Page 330.* French title, for "La" read L'.

*Page 369.* Paragraph 6, last line, after the word "Operation" insert gegeben.

*Page 381.* Second line from bottom, for "sublima" read sublimé.

*Page 893.* Paragraph 4, last line, for "scrabreuse" read scabreuse. Paragraph 6, second line, after the word "fois" insert un. Paragraph 9, for "qu' à la" read qui a la.

*Page 894.* Paragraph 2, second line, for "la siège de la" read le siège de le.

*Page 895.* First line, for "resortir" read ressortir. Paragraph 5, last line, for "forcement" read fortement.

*Page 897.* Paragraph 5, third line from bottom, for "appres" read apres. Paragraph 6, second line from bottom, for "la" read le.

*Page 898.* Paragraph 4, for "guarantie" read garantie.

*Page 899.* Paragraph 6, for "uni" read nui.

2948

INTERNATIONAL MEDICAL CONGRESS
SEPT. 5TH WASHINGTON 1887.

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# MINUTES OF THE SECTION.

The Section met in the "Rifle's Hall," in Washington, D. C., at 3 o'clock P. M., Monday, September 5th, 1887, and was called to order by the President. After announcing the rules and order of business, Surgeon Joseph R. Smith, of the U. S. Army, was called to the Chair and stated that the first order of business was the opening Address by the President of the Section, Professor Henry Hollingsworth Smith, M. D., of Philadelphia.

Professor Smith then delivered an address on "The Influence of the Geographical and Social Peculiarities of the United States upon its Military Service and especially on its Medical Staff."

Upon its conclusion, it was, on motion of Dr. Frederick Hyde, of Cortland, N. Y., seconded by Dr. B. A. Watson, of Jersey City, N. J., resolved that the thanks of the Section be extended to the President for his instructive Address, and that it be referred for publication. Adopted by a unanimous vote.

A paper on "A Short Scheme for Water Analysis in the Field," by Francis Patrick Staples, M. K. Q. C. P., Ireland, Surgeon in the Aldershot Camp, Eng., was then presented by the President, with the statement that the Author was unfortunately prevented by domestic affliction from attending the Congress, and that the apparatus accompanying and illustrating the Paper had been accidentally left in England, though it was anticipated that it would be subsequently forwarded. Deputy Surgeon General Marston, of London, was therefore invited to read Dr. Staples' paper, which he did, and on motion it was ordered to be published in the "Transactions."

A paper on "The Necessity of a More Careful Examination of the Water Supply of Military Posts and an Examination of Hygienic Surroundings, where an Unusual Amount of Sickness Prevailed," was presented and read by Morse K. Taylor, M.D., Surgeon and Major of the U. S. Army. This paper was debated by Surgeon Wm. Harris Lloyd of the British Navy, Joseph R. Smith, U. S. Army, and Deputy Surgeon General Marston, of London (see *Debate*), and ordered for publication.

A paper by Surgeon Joseph R. Smith, U. S. Army, on the "Best Ration for the Soldier," was read and referred to the Publishing Committee.

The paper "On Stretchers and Stretcher Slings," by Surgeon John Dennis McDonald, Inspector General of Hospitals and Fleets (retired), London, was read, in the absence of the author, by Surgeon William H. Lloyd, of the British Navy, and with the exhibition of drawings and models, was referred to the Publishing

Committee, with a letter in support of their use, from Dr. Henry F. Norbury, C. B., Fleet Surgeon of the Royal Navy, addressed to the President of the Section.

A paper on "Stretchers and Stretcher Drill," with Illustrations, by Assistant-Surgeon Valery Havard, U. S. Army, was read by title, in the absence of the author, and referred to the Publishing Committee.

The paper "On Hospital and other Huts, with Designs for Tropical and other Service," was next read by Deputy Surgeon General Jeffrey A. Marston, accompanied by illustrative drawings, etc.

Upon motion it was referred to the Committee on Publication.

A paper on "The Construction of Field Hospitals, as Illustrated in the Depot Field Hospital of the Army of the Potomac at City Point, Virginia, in 1864–65," was read by Dr. James Collins, of Philadelphia, accompanied by drawings and diagrams.

Dr. W. Varian discussed this paper, especially in reference to modifications for the heating of hospital tents.

Referred to the Publishing Committee.

Prof. Robert Reyburn, M. D., of Washington, read a paper, "Are Wounds from Explosive Balls of such a Character as to Justify International Laws against their Use." This was followed by a paper on the same subject by Charles Hobart Voorhees, M. D., of New Brunswick, N. J.

Dr. Voorhees, in connection with the subject of Explosive Balls, offered the following Resolution :—

*Resolved*, That in accordance with the sense of this Section, the Secretaries be instructed to present this opinion to the Ninth International Medical Congress, and ask that the Congress direct that the expression of their opinion on the subject of International Laws against the use of Explosive Bullets in warfare be forwarded to the President and Secretary of State of the United States, and to each representative of the Foreign Legations at Washington, with a request that each shall transmit the same to their respective governments.

This motion was discussed by Drs. Marston, Lamb, and President Smith, and then adopted.

TUESDAY, SEPT. 6th.—SECOND DAY.

On the assembling of the Section, a paper on "Age and Acclimatization of Soldiers in Reference to Service," by Jeffrey A. Marston, M. D., M. R. C. P., Deputy Surgeon-General and Head of the Sanitary and Statistical Branch of the British War Office, London, was read by the author and discussed by Dr. M. K. Taylor, United States Army, and others. (See *Debate.*)

A paper on "Heat Stroke in India," by John Anderson, M. D., Brigade Surgeon (retired), London, was read by the author and freely discussed. (See *Debate* following the paper.)

A paper in the German language on "The Modern Demand for Stationary and Movable Hospitals in War," by Dr. J. Neudorfer, of Vienna, Sanitary Chief of

the Fifth Army Corps of Austria, was read by title, in the absence of the author, and referred for publication in the "Transactions."

A paper on "The Best Models and Most Easily Constructed Military Hospitals for Temporary Use in War," by S. H. Stout, M. D., LL. D., of Cisco, Texas, was similarly referred.

A paper on "The Present Standpoint of Antisepsis, and the Best Mode of its Application in War," by J. Neudörfer, M. D., Chief of the Fifth Army Corps of Austria, written in German, was read by title and referred for publication in the "Transactions."

A paper on "The Primary Treatment of Gunshot Wounds," by B. A. Watson, M. D., of Jersey City, N. J., was read by the author and referred for publication after debate (see *Debate*) by Dr. Cullen, of Richmond, who claimed that antiseptic dressing on the field was impracticable; by Dr. George L. Porter, of Bridgeport, Conn., who urged all diligence in the outset of a wound and primary dressing; by Dr. Varian, of Titusville, Pa., who differed from Dr. Cullen in regard to the neglect of any resources for a first dressing, and by Drs. Langridge, of the British Army; J. L. Stewart, M. D., of Erie, Pa.; Prof. Carnochan, of New York City; Dr. L. von Farkas, of Buda Pesth, Hungary; and B. A. Watson. (See *Debate*.)

A paper on "The Importance of the Government Securing and Preserving Vital Statistics in the Army and Navy for the Benefit of Subsequent Applicants for Pensions," was presented and read by Prof. E. A. Wood, M. D., of Pittsburgh, Pa., and ordered for publication in the "Transactions."

A paper on "The Importance of International Regulations for the Medical Treatment of Prisoners of War," by Daniel S. Lamb, M. D., Asst. Surgeon, U. S. Army, was read and referred for publication. A recommendation that the Secretaries of the Section communicate the conclusions agreed on, in this paper, to the Ninth International Medical Congress, for their action, was adopted by vote.

## WEDNESDAY, SEPT. 7th.—THIRD DAY.

On the opening of the session this day at 11 A. M., a paper on "The Proper Treatment of Penetrating Wounds of Joints," by Prof. Frederick Hyde, M. D., of Cortland, N. Y., was read by the author and ordered to be published in the "Transactions."

A paper on "What Is the Proper Treatment of Wounds of the Joints?" by Prof. Joseph D. Bryant, M. D., of New York City, was ordered for publication.

A paper on "Penetrating Injuries of Joints, Especially Gunshot Wounds," by George L. Porter, M. D., of Bridgeport, Conn., Asst. Surgeon, U. S. Army, was read and ordered for publication.

These papers were discussed together by Drs. Langridge, of the British Army; von Farkas, of Buda Pesth; Janes, of Vermont; Buvinger, of Pittsburgh; Bontecou, of Troy; Marston, of London; B. A. Watson, of Jersey City; Prof. Gregory,

of St. Louis; Wood, of Pittsburgh; Reyburn, of Washington; Lemoyne, of Pittsburgh; Stern, Sanders and Griswold, of Pennsylvania. (See *Debate.*)

A paper on "Non-Fatal Penetrating Gunshot Wounds of the Abdomen Treated Without Laparotomy," by Henry Janes, M. D., of Waterbury, Vermont, formerly Surgeon U. S. Volunteers, was read by the author and referred for publication, after discussion.

On "The Treatment of Penetrating Gunshot Wounds of the Abdomen," by Thomas J. Moore, M. D., of Richmond, Va., and one on "The Proper Treatment of Penetrating Wounds of the Abdomen," by Prof. Joseph D. Bryant, M. D., of New York City, were also ordered for publication.

The entire subject was discussed by Dr. Thomas G. Morton, of the Pennsylvania Hospital, Philadelphia; the President of the Section Dr. Henry H. Smith; Surgeon Edwin Bently, U. S. Army, and others. (See *Debate.*)

A paper was then read on "The Causes and Best Treatment of Erysipelas," by Prof. Joseph D. Bryant, M. D., of New York City, and referred to the Committee on Publication.

A paper on "Hospital Gangrene," by William Varian, M. D., of Titusville, Pa., formerly Surgeon U. S. Volunteers, was ordered to be printed, after discussion.

The time having expired, the Section adjourned at 6 P. M.

THURSDAY, SEPT. 8th.—FOURTH DAY.

The Section met at 11 A. M., the first paper being on "The Etiology and Treatment of Camp Dysentery and Diarrhœa," by Charles Wesley Buvinger, M. D., of Pittsburgh, late Asst. Surgeon, U. S. Army. After a brief discussion the paper was ordered to be printed.

A paper on "The Best Form of Report of Sick and Wounded for Adoption in all Armies," by Joseph R. Smith, M. D., Brevet-Colonel and Surgeon, U. S. Army, was read by the author, with the exhibition of diagrams, tables, etc. Ordered for publication.

A paper on "Practical Considerations of Human Nosography," by Prof. John W. S. Gouley, M. D., of Bellevue Hospital, New York City, was read by the author and ordered to be published, after full discussion of both papers by Drs. Gouley, J. R. Smith, Bontecou, Clark, Didama, Hyde and Hingston. (See *Debate.*)

A paper "On the Etiology and Treatment of Tetanus," by Charles W. Brown, M. D., of Elmira, N. Y., was read by the author and fully discussed by Prof. J. McF. Gaston, M. D., of Atlanta, Ga. (See *Debate.*)

The paper was ordered for publication.

FRIDAY, SEPT. 9th.—FIFTH DAY.

The Section met, as usual, at 11 A.M. A paper on "Injury, no Longer a Warrant for the Amputation of a Living Part," by Prof. E. H. Gregory, M. D., of St. Louis, was read by the author and ordered for publication.

A paper on "Gunshot Fractures of the Femur," showing the result in 437 cases, by Henry Janes, M. D., formerly Surgeon U. S. Volunteers, of Waterbury, Vermont, was read in full by the author and directed for publication.

An essay on "The Kind of Dressing Most Available for Gunshot Fractures of the Lower Limbs in Connection with Transportation," by Richard Francis Tobin, M. D., Brigade Surgeon (retired), British Army, was read, in the enforced absence of the author, and drawings exhibited, by Deputy Surgeon General Marston, and ordered for publication.

A paper on "The Superiority of Bavarian Plaster-of-Paris Dressing in Gunshot and Other Fractures of the Limbs," by James H. Peabody, M. D., late Surgeon U. S. Volunteers, of Omaha, Nebraska, was read by the author and illustrated by drawings, etc, and ordered for publication in the "Transactions." The discussion of the preceding papers was made by Drs. Stern, of Philadelphia: Bontecou, of Troy, Joseph R. Smith, U. S. Army; Peabody, of Omaha, and Prof. Hy. H. Smith, President; reference being made to the various materials and form of the *appareil inamobile* of Suetin, and others. Dr. Peabody, in closing the debate, said that there was no other material so fitted for the rapid stiffening in the field, as flannel or other porous splints of Plaster-of-Paris; hence, the revival of its use by Pirogoff, Suetin, Nussbaum, and other European surgeons. There was no splint which could be more rapidly applied, or which was more firm when applied, than the "Bavarian." The mixture of oxide of zinc and glue mentioned by Dr. Stern was objectionable only on account of the necessity of its having to be boiled, which required greater time. The Silicates, also require greater time to harden, which is an objection in field practice. The mode of applying the Bavarian splint was comparatively new, and it did not disprove its superiority if stiffened with zinc and glue; the principle was the same. Time was, however, a great desideratum in the field, and the use of Plaster would save it.

TESTIMONIAL TO DR. SMITH, PRESIDENT OF THE SECTION.

On the conclusion of the preceding debate, Deputy Surgeon General JEFFREY A. MARSTON, of the War Office, London, moved that the President now vacate the chair, and that Dr. Wm. Harris Lloyd, Deputy Inspector General of Hospitals and Fleets in the British Navy, be called to it, for the transaction of Special Business. Dr. Lloyd then took the chair.

Prof. E. A. WOOD, M. D., of Pittsburgh, then placed on the table an elegant Onyx vase, appropriately inscribed, and uncovering it, said:—

MR. CHAIRMAN: Would that we could remove the mask of selfishness and deceit from about men's hearts, as I now remove the cover from this beautiful vase.

In removing this veil, I figuratively remove the veil from our hearts and reveal to our friend and our presiding officer, Dr. Henry H. Smith, the warm place he occupies in our affections.

Dr. Smith, by this gift we mean something more than reward; more than a souvenir; more than individual regard for you. We wish by it to imply that you are the bond by which has been cemented together, stronger than ever before, the Medical Profession of two Hemispheres; that *you* have broken down the walls that fence in exclusiveness and have influenced illustrious practitioners and teachers of the whole world to rub elbows with the "Rank and File" of the Profession in the United States. Whatever of detraction and want of interest in the work of this Congress there may have been, the fault must be laid at the doors of those who, for reasons best known to themselves, have followed this Congress with constant and bitter opposition. We wish the world to know that while we honor you and applaud your work, we condemn the flagrant treachery of those, who, lost to all sense of fraternalism, labored to defame the Medical Profession in America. Your cause was ours; ours, the cause of the whole Profession wherever found. Opposition to you was opposition to us, and the taunts and sneers you suffered, were felt by the whole Profession in this vast country. We stand by you as you stood by us, and as old Homer stood by his friends two thousand years ago, when he wrote:—

"A generous friendship no cold medium knows;"
"Burns with one love; with no resentment glows;"
"One our interests, one our passions be;"
"My friend must hate the man who injures me."

Your unswerving devotion to the cause and your unfaltering efforts to make this Congress a success, has taught a lesson or two which should be learned: first, that the "learned Professor and the Country Doctor" are nearer akin than was supposed; second, that professional glory and renown, in this land, do not attach themselves only to a few egotistical men. We have learned that there can never be in the United States, a medical nobility, and that a medical man must stand with the rank and file or be ignored.

The day will come, and that soon, when, through experience, the whole harmonious Profession will again invite the Congress to meet in the United States of America, and we will give it such a reception as the world never saw.

Dr. Smith, may you live long to enjoy the happy recollections recalled by this Vase, and in saying to you "Good Bye" we send with you the sentiment contained in the words of Burns:—

"Ye whom social friendship charms,"
"Who hold your being on these terms,"
"Come to my Bowl, come to my arms," my more than Brother.

Prof. J. McF. GASTON, M. D., of Atlanta, Ga., then presented the following resolutions for the consideration of the Section in connection with this donation, saying:—

Mr. CHAIRMAN, I have been delegated to present the following resolutions to Dr. Smith.

*Resolved*, That in consideration of the extraordinary labors of Henry Hollingsworth Smith M. D., LL. D., in organizing the Section of Medical and Naval Surgery and Medicine, and his great efficiency in presiding over its sessions, it is hereby

*Resolved*, That Dr. Smith has preëminent claims upon the members of this Section for his judicious administration of its business meetings, and that the hearty thanks of the Section are hereby extended to him, with a high appreciation of his useful work in connection with the general interests of the Ninth International Medical Congress.

*Resolved*, That a Committee consisting of Surgeon Joseph R. Smith, of the U. S. Army; Jeffrey A. Marston, of Her Majesty's Army; and Prof. Charles D. Phillips, of London, be requested to communicate this action to Prof. Smith.

*Resolved*, That these proceedings be recorded in the Minutes of the Section.

These resolutions were seconded by Surgeon General Marston of London, who said:—

Mr. CHAIRMAN, "When a man is unexpectedly called on to say or do anything, although it may not be done or said as gracefully as if premeditated, it has the advantage of being natural, and, therefore, truthful and without affectation. We would," he said, speaking for the foreign guests, "be profoundly ungrateful if we did not value all that has been done for us in America. Of course, we had heard of Professor Smith, of Philadelphia, of his Professorial and Professional work and of his Academic distinctions; but it is necessary in many cases not only to hear with the ear but also to see with the eye, to adequately recognize a man's work and qualities. Only a personal acquaintance with Professor Smith could give a correct idea of this. It was not only as President of this Section that his qualities were noticeable. His urbanity in little things was highly characteristic of Dr. Smith. As a glimpse of sunshine in a dark room gives you an idea of temperature and the character of the room, so the glimpses of sunshine constantly appearing in social life, at the breakfast and dinner table and everywhere, manifested the character of the man as truly one of nature's gentlemen, courteous and thoughtful in everything. I would wish, Mr. Chairman, nothing better or more pleasurable than to introduce Dr. Smith to my friends and family in England as a specimen of a true American gentleman. I have conceived a personal affection in regard to him that is shared by all of us."

Professor HENRY D. DIDAMA, M.D., of Syracuse, N. Y., said:—

New York gladly endorses every word which can be said in praise of Dr. Henry H. Smith. A gentleman by instinct, his kindly honest face is a benediction; his whole life a benefaction. As a diligent student, a ripe scholar, a teacher of great aptness and wisdom, a distinguished author and an eminent surgeon, he is widely known and everywhere beloved. Jealous for the honor of his profession and untiring in his efforts to promote its welfare, he has done his full share in making this Ninth International Medical Congress what it is, a preëminent and triumphant success. Long may his eye continue undimmed, his natural strength unabated and his ever youthful though hoary head remain as a crown of glory, because found in the way of righteousness.

The Chairman, Dr. WM. HARRIS LLOYD, of London, also expressed his cordial participation in this recognition of Dr. Smith's valuable services, and after taking a unanimous vote in support of the resolutions, requested the Committee to carry out the vote of the Section, which was done in a few words addressed to Dr. Smith.

Dr. SMITH on rising to reply said:—

There are moments in life when the emotions of the heart cannot be adequately expressed by speech. The action of this meeting is so entirely unexpected that I

am unable to respond as I would wish to do, to the very flattering and eloquent remarks of the gentleman making the presentation of this beautiful vase; nor to the fervid expressions of the members of the Section who have honored me by so high an estimate of my labors, in the interest of this Congress. I cannot but express my ignorance of any acts I have performed, at all worthy of this demonstration of your high regard. Whatever of success has followed my efforts as Chairman of the Executive Committee of the Congress, is largely due to the members of a Committee of whom I was only the agent and mouthpiece. Our efforts to advance the interests of the Congress have been so warmly seconded by many of our friends in London and on the Continent, that I recognize how much of the results of the Congress is due to the action taken by British practitioners in London, to neutralize the misrepresentations of those who went abroad as the emissaries of a clique, to cast discredit on their country and profession in order to gratify personal pique. I cannot better express my regret at their course (for which I bear no malice but rather feel deep sorrow) than by quoting the words which the Wizard of the North placed in the mouth of Childe Harold,

"Breathes there a man with soul so dead,
Who never to himself hath said,
This is my own my native land.
If such there be, go mark him well;
For him no Minstrel's rapture swell,
High tho' his title, proud his name,
Boundless his wealth as wish could claim.
Despite his titles, power and pelf,
The wretch, concentred all in self,
Living, shall forfeit fair renown;"

and this formerly fair professional renown has now a blot upon it not easily removed. Wanting in patriotism and failing to appreciate the social obligation incurred by the invitation given and accepted at Copenhagen, they must soon recognize the truth of the result as depicted by the Poet.

Gentlemen, I thank you warmly for this artistic illustration of your kind feelings. The social intercourse I have had, especially with the London members of this Congress, has been a daily source of pleasure to me, and I most heartily reciprocate their friendly expressions.

I again thank you and shall value your offering during life and carefully preserve for my descendants this chaste memento of your personal good will and friendship.

The Chair was then vacated by Dr. Lloyd, and upon resuming it, the President stated that, the business of the Section for the morning being concluded, the remaining papers would be read at the Afternoon Session.

When the Section re-assembled at 3 o'clock P. M., a paper on "What Class of Gunshot Wounds and Injuries Justify Resection or Excision in Modern Warfare," was read by Reed B. Bontecou, M. D., Surgeon U. S. Volunteers, of Troy, N. Y. After discussion, the paper was on motion referred to the Committee, for publication.

An Essay on "What Conditions on the Field Justify Amputation in Gunshot Wounds?" (with statistics) by E. Griswold, M. D., of Sharon, Pa., Lieut. Col. and Col. by Brevet, U. S. Volunteers, was referred, by vote, for publication.

Discussed by Drs. Bontecou, E. A. Wood, Collins, Beidler, and Griswold, who closed the debate (see *Debate*).

Owing to the hour and at the request of the Author, who was unable to be present, an extended paper on "Typhus Fever in the Camps, Hospitals and Prisons of Our Civil War," by Charles Smart, M. D., Major and Surgeon, U. S. Army, Washington, D.C., was read by title, and directed to be printed in the "Transactions" of the Congress.

The business of the Section being now completed as stated in the Programme, the President complimented the Section on their faithful devotion to its sessions and congratulated them on the result of their labors, the value of which would be shown in the printed "Transactions," and with thanks for the courtesy and attention yielded to the Chair during the entire week, declared the Section adjourned *sine die*.

J. McF. GASTON, M. D., Atlanta, Ga.
ELI A. WOOD, M. D., Pittsburgh, Pa.
*Secretaries of the Section.*

# OPENING ADDRESS.

## THE INFLUENCE OF THE GEOGRAPHICAL AND SOCIAL PECULIARITIES OF THE UNITED STATES UPON ITS MILITARY SERVICE, ESPECIALLY ITS MEDICAL STAFF.

### DE L'INFLUENCE DES SITUATIONS GÉOGRAPHIQUES ET DES DIFFERENCES SOCIALES AUX ÊTATS-UNIS, SUR LE SERVICE MILITAIRE, SPÉCIALEMENT SUR LE CORPS MÉDICAL MILITAIRE.

### ÜBER DEN EINFLUSS DER GEOGRAPHISCHEN UND SOCIALEN EIGENTHÜMLICHKEITEN DER VEREINIGTEN STAATEN AUF IHREN MILITÄRDIENST, BESONDERS AUF IHREN MEDICINISCHEN STAB.

BY HENRY HOLLINGSWORTH SMITH, M.D., LL.D.,

Of Philadelphia, Pennsylvania, President of the Section of Military and Naval Surgery.

GENTLEMEN:—In seeking a general topic appropriate to the opening ceremonies of this Section of an International Medical Congress, worthy of the consideration of the eminent military and naval surgeons who are present, nothing seems more natural than the thought which may readily present itself to the mind of a philosophical traveler desirous of recognizing the special results of general causes, viz.:—"The Influence of the Geographical and Social Characteristics of the United States upon its Military Service, especially its Medical Staff."

#### GEOGRAPHICAL PECULIARITIES.

In a Territory as vast as this by which we are surrounded, where as Coleridge has said: "there is a Nation of Freemen living under the laws of Alfred, and speaking the language of Shakespeare," where with an Area of more than three millions of square miles* there is now a little over fifty millions and a half of inhabitants, and where, if you place the fifty millions in one State, as that of Texas, the population would not be as dense as that of Germany; or, if put in Dakota, would not be as crowded as that of England and Wales together,† geographical peculiarities must largely influence the characteristics of the people, and indirectly that of its Military Service.

A distinguished statesman has said, that "he who constantly overlooks broad acres will soon become possessed of broad ideas," and the average citizen of the United States, especially in its Western portion, naturally exhibits an independence of thought that shows itself in all his transactions. With such an extended domain, with common laws, a common currency and no internal Custom Houses, the habit of roving is soon developed and the popular love of travel is so universal, that it may properly be

* The last Census [1880] gave 3,603,844 Square Miles, or 2,306,460,160 Acres.

† "Our Country," by the Rev. Josiah Strong, D.D., page 17, New York, 1887.

designated as a national characteristic. The young American of the present generation, it has been well said, "belongs to a new expansive race that lives on motion; whose home is in a Pullman car and his domestic life, so to speak, mainly on the wing." It is therefore quite natural that Excursion parties to travel from eight to eleven thousand miles in one route, with all the comforts of Hotel and Sleeping cars, should be fully patronized.* With such railroad facilities, it was of course easy in the late war, to transport troops as well as the sick and wounded from one point to another.

The Area of the United States, showing the distances over which sick and wounded were comfortably carried in Hospital Cars and Boats, by rail and by river, may perhaps be better appreciated by the Foreign members of this Section when it is stated, that Texas exceeds in square miles any State in Europe except Russia, Texas containing 274,356 square miles, and the Austrian Empire only 240,000, Germany 208,619, and Great Britain, including England, Scotland, Ireland and Wales, only 120,000.

In the protection and regulation of frontiers of such dimensions from the raids of Indians, and in the enforcement of law and order for the benefit of an Immigration that on May 12th, 1887, amounted in the Port of New York alone, in one day, to 10,000 persons and in the last thirteen years to Five Millions of people, the Army of the United States in time of peace finds full occupation.

In a country of this magnitude, which with its varied climate, grows oranges and sugar cane in one section, and cuts ice with the plow and saw into pieces twenty-four inches square in another; where with the thermometer at 90° Fahrenheit, in Philadelphia in August, 1885, there was frost the same night in Michigan and Dakota; where vast Alkaline Plains and Salt Springs on the South are counter-balanced by great fresh-water Lakes or inland Seas on the North, it is not surprising that troops on the march or in camp, should be especially affected by the varieties in temperature and soil created by these Geographical peculiarities, and that our military surgeons should have a varied experience in the diseases induced by such surroundings. The reports of the Surgeon General's Office, not only show this in the prevailing diseases at our forts, as Malarial and Mountain Fevers, Rheumatism and Camp Dysentery and Diarrhœa, but they also exhibit the thermometric variations of a climate to which our troops are necessarily exposed. Thus at Fort Lyon on the Arkansas River, at an altitude of 400 feet, it sometimes happens that in Summer the variation of temperature is 40° in twenty-four hours; while in winter, it is often 80°, being 65° Fahrenheit at 11 A. M. and — 15° the same night.† These climacteric changes are well known and not noted solely by the records of the Surgeon General's Office, as Col. Dodge, of the U. S. Army, in writing of the "Great Plains" says,‡ "the Winters of the Plains are peculiar: for a week no overcoat is needed, the presence of winter being scarcely recognized. Then comes a storm and no cloth-

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* As the Raymond Excursion parties from Boston to San Francisco, and thence to Alaska and the Yellowstone Park.

† Report of the Surgeon General's Office, page 41, 1883.

‡ "The Great Plains," by Lieut. Col. Richard Irving Dodge, U. S. A., page 30. New York, 1887.

[The western half of the United States is a broad highland, divided by the Rocky Mountains into nearly equal sections. The eastern section is a gently descending slope known as "The Great Plains" and consists principally of rolling prairies, like the waves of the ocean solidified.]

ing suffices to keep the icy wind from the person. During the Winter of 1872-3 at least seventy capital amputations were performed by the Post Surgeon for frost-bite." The changes of temperature though so marked in the West are not limited to that region, the whole Atlantic Coast having a winter temperature 10° Fahrenheit lower than that of Western Europe in the same latitude. In addition to the suffering caused by sudden variations of temperature, due to the influence of Mountains, Lakes and Plains, the soldier on the march is also liable to suffer from the character of the Soil. Thus on the Cimmaron River, in the Indian Territory, there is as described by Col. Dodge,* "for thirty or forty miles an expanse of loose sand so strongly impregnated with salt, that the Buffalo lick it up greedily; while Rock Salt is found in abundance, and can be quarried in masses from beneath the soil. On the West of the North-Platte River, in the horrible 'Alkaline Plains' the dry earth is covered with a whitish efflorescence, and every puff of the sultry wind fills each pore of the traveler with an acrid, caustic dust, that is irritating to an intolerable degree. The skin cracks, the eyes become inflamed, the tongue swells, the lips bleed and the throat is parched. The water does not quench thirst but irritates the alimentary canal, until after many days' marching the helpless traveler reaches his destination as full of suffering and torture as could be developed by the most inventive savage."

A brighter side of this Geographical description as affecting the soldier in other parts of the country is, however, found in many localities, where shade, running streams, and pure springs, furnish surroundings of great importance to the health and comfort of the camp. A picture of another portion of the Great Plains is so well drawn by the late Major-General Custer, of the United States Cavalry, that I quote it in full: "To describe," says Gen. Custer,† "this region, as one would view it in journeying on horseback over this beautiful and romantic country, to picture with the pen those boundless solitudes, so silent, that their silence alone increases their grandeur; to gather inspiration from Nature and attempt to paint the scene as my eyes beheld it, is a task before which a readier pen than mine might well hesitate. The air is pure, fragrant, and as exhilarating as the purest of wine; the Climate entrancingly mild; the Sky clear and blue as the most beautiful Sapphire, with here and there clouds of rarest loveliness, presenting to the eye the richest commingling of bright and varied colors. Delightful odors are constantly being wafted by, whilst the forests filled with the Mocking Bird, the Colibri, the Thrush and the Humming Bird, constantly put forth a joyful chorus and combine to fill the soul with visions of delight and enhance the perfection and glory of Creation."

Such are only a few of the Geographical peculiarities of the United States that my limits, at present, permit me to enumerate as affecting its Military Service in time of peace, whilst during War they naturally entered into the consideration of the plans for the Hospital treatment and transportation of the sick and wounded.

### SOCIAL CHARACTERISTICS.

In studying the Social Characteristics of any nation, the influence exercised by the habits and surroundings of its early settlers, must always be remembered, as these continue to develop the character and peculiarities of subsequent generations. "It is impossible" says Roosevelt, ‡ "to understand the social and political life seen

* Opus citat. page 16, 17, 1877.

† "My Life on the Plains," by Maj.-Gen. G. A. Custer, U. S. Cav., p. 11, N. Y., 1874.

‡ Life of Thos. Benton, Senator U. S., by Theo. Roosevelt, page 6, et supra, Boston, 1887.

in the United States, unless we bear in mind the fact, that the first settlers, whilst handling the axe and the plough, also carried the Rifle. These colonists soon acquired military training in the long continued wars in which they were so often engaged, being compelled to defend their homes and families against savages capable of sending into the field thousands of Warriors whose bravery and organization made them as formidable as trained soldiers." Indeed the Iroquois, or Six Nations, the Hurons, Oneidas, Mohegans, Mohawks and other tribes of the North, were constantly on the war-path against the early settlers of this country from 1609 to 1792, and from the latter period to the present, the Army of the United States has been frequently called on to punish the aggressive acts of the Creeks and Seminoles on the South, and quite recently to control and disperse marauding and massacring parties of Dacotahs and Sioux, of Comanches and Apaches on the South-west; a large number of the latter being now held at Fort Marion, in Florida, as prisoners of war. As late as 1862 the Dacotahs made a terrible massacre of the settlers in Minnesota, and in 1873 the Modocs killed Peace Commissioner Thomas and many families; while two years later [1876] the noted chief Sitting Bull, with a large body of warriors, successfully opposed the United States soldiers sent to punish him, and escaped with the bulk of his possessions and tribe into Canada, after killing Majr.-Genl. Custer and nearly all his command in the battle near the Big Horn Mountain (June 25th, 1876).

That Indian Warriors are not to be despised as foes, was also shown in the experience of the regular troops of France and England during the last century, especially in the defeat of the British General Braddock near Fort Duquesne, now Pittsburg. The "Massacre of Wyoming," immortalized by the poet Campbell in his "Fair Gertrude of Wyoming," also illustrates the sufferings of the colonists from Brandt and the Oneida Indians.

In these contests, so characteristic of the settlement of a country reclaimed from the Wilderness and the Savage, we find the origin of the military spirit and habits of life that left their impress on later generations, and furnished the armies of 1776 and 1861 with Riflemen whose remarkable skill had been gained in hunting, from their youth upward.

Among a people whose social life is characterized by each family residing in a separate dwelling; where the humblest day laborer enjoys wheat bread and meat daily, and rides, in our large cities, to and from his labor in a street car, spending a penny of his wages each day for the much-coveted newspaper; in a community where his children are educated even to a high degree at the public expense,* it is very common to recognize an amount of intelligence in the masses, that is largely due to Republican institutions, and especially to our Common School system, and this intelligence becomes available in many who are recruited from time to time into the Military Service. This service, though permanently held on a comparatively small scale, is yet capable of being developed to an extraordinary degree at short notice, as was fully illustrated in the War of 1861, when the call of the Government aroused the people to an active response to the support of the regularly constituted authorities at Washington. As a nucleus for a larger army, the small force usually held, while proving sufficient for the protection of our large frontier, also preserves, by education and training, an elevated class of officers capable of judiciously organ-

* In the Normal and High Schools the course of instruction trains the pupils to a degree that qualifies them to become Teachers or fits them to become Clerks or Professional men, many rising to distinction at the Bar or on the Bench, as well as in the Medical profession.

izing the fresh troops, or the Militia or National Guard, of the various State organizations.

The Social characteristics of the people of the United States are also exhibited in the facilities presented to each one to attain political and social eminence. As the highest offices of the Government are open to the ambition of any native-born citizen, it is not uncommon to note great changes effected in a few years in the position attained by any properly qualified individual. Hence, one who commenced life as the humblest citizen, often reaches the most elevated station in civil as well as Military life, more than one President of the United States having been advanced from the work of the farm or trade, to the duties of the Presidential Chair.* "The genius of our national life," as was recently well stated by President Cleveland,† "beckons to usefulness and honor men in every sphere, and offers the highest preferment to manly ambition and sturdy honest effort, hastened by patriotic hopes and aspirations."

The private soldier of our Army may also rise from the Ranks to the highest grade of Military command if he has the proper merit, two Brigadier-Generals now on the Army List having well illustrated this deserved promotion. ‡

It is therefore not surprising, when we recall the sudden development of events caused by the late war, that we should recognize in many of our Military leaders, as well as Military Surgeons, during this period, those who previously and subsequently occupied offices or were and are now engaged in civil pursuits ; § and Major-General Sherman has written ‖ "that at the close of the War some of our best Corps and Division Commanders, as well as Staff Officers, were taken from civil life," thus showing the influence of the Social Characteristics of the United States upon its Military Service in time of war. When the late War commenced, March, 1861, the Army of the United States consisted only of an aggregate strength of 13,024 Officers and Men, of whom 115 were Medical Officers, all told. On the subsequent 4th of May or 60 days later, its strength had been increased to 30,973 ; but at no time during the War did the Regular Army attain a strength of 25,000 men ; all the rest engaged in the War were Volunteers who regularly enlisted for three years or the War, making 2,670,851 Men enlisted from 1861 to 1865.¶

When, by the Proclamation of President Lincoln, an Army of 500,000 men was created in a few months, when from the workshop and the factory, from the loom and the mine, from the Pulpit and the Bar, there sprang up a body of intelligent men in response to his call, the Medical Colleges and the Hospital Surgeons, were not tardy in offering their contribution of skilled service. Soon the Civil Surgeon transferred from private practice to Army life, and assimilated to the Regular Staff under the

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* The distinguished General Andrew Jackson was in early life apprenticed to a Saddler; then became a School Master, a lawyer, a General of Militia, and subsequently the incumbent of the "White House" and the great leader of the Democratic Party in the United States, they annually celebrating the return of his Birthday [Jan. 8th] with appropriate ceremonies. [Wikoff's "Reminiscences of an Idler," page 26, 1880.]

† Address of President Cleveland at the unveiling of the Garfield Statue at Washington, May 12th, 1887.

‡ The Adjutant-General and the Chief Signal Officer of the U. S. Army were once privates. —*Public Ledger*, Philadelphia, March 5th, 1887.

§ Alex. L. Webb, LL.D., President of the College of New York, became Assistant Chief of Artillery of the Army of the Potomac, Chief of Staff, and then a Major-General.

‖ Memoirs, Vol. 2, p. 383, July, 1885.

¶ Appleton's Encyclopædia.

title of "Brigade Surgeon of Volunteers," found himself compelled to add a knowledge of Military laws to the Professional education he had previously received. In this way more than one of those occupying Professorial Chairs became the Military head of a Hospital or the Medical Director or Surgeon-in-Chief of an Army Corps, and the historian of the future will doubtless recognize in these transformations during War, the influence of the social characteristics of this country, upon the performance well and thoroughly of duties that are usually assigned to the Regular Army.

During the War of 1861, the Medical Staff of the Regular Army was increased from its original 115 Officers on its rolls, to 2109 Regimental Surgeons and 3882 Assistant Surgeons, all taken from private life and only familiar with civil practice. Although these gentlemen were thus so suddenly transposed, they proved themselves amply qualified for their new duties, and at the end of the War Surgeon-General Barnes said, * "The ability, courage and zeal manifested throughout the War by the Officers of the Medical Department, under all circumstances and upon all occasions, was honorably testified to by the number (32) killed in battle or by Guerrillas or Partisans; 83 were wounded in action; 4 died in Rebel prisons; 7 of Yellow Fever; 3 of Cholera, and 271 of diseases incident to Camp life or the result of exposure in the field."

Of the amount of labor they performed it is also stated † that "there were treated by them in 205 General hospitals, 6,954,834 cases of Diseases and Wounds, and that of these only 186,216 died of Disease and 49,205 of the effects of wounds.

The amount of money expended by the Medical Department of the United States during this period for the benefit of the sick and wounded, and *exclusive* of salaries, was *$47,356,982.24*, all of which expenditure of money and medical supplies was almost without exception distributed by these Medical Officers over this vast country and properly accounted for. ‡ Lieut.-Gen. Grant also bears his testimony to the valuable services rendered by surgeons taken from civil life and placed in charge of troops in the field. Writing of his Western Campaign on the Mississippi River in 1862, he says, § "When long continued heavy rains with high water in the River, had covered the entire country, so that the troops could scarcely find ground on which to pitch their tents, Malarial Fever, Measles and Small-Pox broke out; but the Hospital arrangements and Medical attendance were so perfect, that the loss of life was much less than might have been expected."

In thus giving credit to the services rendered by the Volunteer Surgeons during the War, it must not be forgotten that they were ably directed and assisted in all the details of Army Routine by the experience and skill of the Surgeons and Medical Directors of the Regular Army, and many "Brigade Surgeons of Volunteers" yet recall with satisfaction, the agreeable and useful results of their personal association with the members of the accomplished Medical Staff of the Regular Army.

Among the numerous civil surgeons thrown temporarily into Military Service, was the President of this Section, who, with others from various portions of the United States, was taken from the duties of a Surgical Professorship in a University, to learn by personal observation in the field, the correctness of the precepts of Military

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* Surgical History of the Rebellion, Vol. 2, Part II, p. 901, et sequitur, by Surgeon Geo. A. Otis, U. S. A., and David L. Huntington, U. S. A. Washington, 1883. † Opus citat.

‡ Surgical History of the Rebellion, as before quoted, page 902.

§ Personal Memoirs of Ulysses S. Grant, vol. 1, page 458, et supra. N. Y., 1885.

Surgery which he had previously tested and taught only in civil hospitals. With others thus transported, was also a late Vice-President of this Section, a Surgeon distinguished for his literary as well as his surgical accomplishments, and who soon proved himself as proficient in the field and active service, as he was in the treatment of Fractures and Dislocations in Civil Life. Few medical men have gained more reputation for skill and sound judgment as a Military Surgeon than was justly accorded to our former associate in organizing this Section, Dr. Frank Hastings Hamilton, of New York City. Entering the army in the early months of the late War, he was successively promoted to be "Brigade Surgeon of Volunteers" and "Medical Inspector," proving himself on all occasions fully equal to the duties that so suddenly devolved upon him. His recent death created a void in this Section and in the Medical Profession of the United States that has been widely felt.

As Military and Naval Surgery is only a division of the Science of General Surgery, these transformations from civil to military life are not so marked a change of duty as might at first be supposed. Military and Naval Surgery and Medicine, as a Section of an International Medical Congress, naturally brings into its scientific discussions, many points that are common to the education of both Military and Civil surgeons. Hence not a few of those now present, have laid aside their former military titles and duties and are again occupied with their professional life as Civil Surgeons; while the great army of two millions of men that formerly existed, has been reduced in various ways to twenty-five thousand—eight hundred thousand officers and men having been paid off at the end of the war, most of whom are now engaged in civil pursuits. In these changes of service, many officers and privates have personally illustrated the traits so well ascribed to the late author* of a well-known work on "International Law" and shown like him, that "when soldiers they were completely soldiers, but when civilians not a vestige of the soldier remained." Lest, however, the change of duties of our former Military Surgeons should leave this Section without that direct and recent support that its title justly calls for, I am happy to be able to state, that it has the active interest of many who are well and widely known as at present connected with both the Army and Navy of various nations during long periods of service; of gentlemen whom you will all recognize in the immediate vicinity of the Chair, and around this Hall as active participants in the discussions of the topics that will be presented. Some of them have spent their lives in active service and having retired, now rest on their laurels; others carry on their persons honorable scars of wounds received in the performance of their arduous and benevolent duties. Some have served with recognized distinction in the Black Sea, and at the bombardment of Sebastopol during the Russian War. Some were in the Indian Mutiny, the Crimea, and the Soudan. Some, merited distinction in the Franco-Prussian War, and some have served in Ironclads through the din and suffering of heavy maritime bombardments in China and elsewhere, and some after a quarter of a century can recall the exposure and privations they endured as Prisoners of War.

From the vast amount of experience thus collected in active service, will be drawn most of the scientific work of the Section; a Section only developed within a few years in connection with the different meetings of this International Medical Congress, and now growing in importance, by the accumulated facts gained during the wars of the last fifty years.

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* Memoir of Major-Gen. Halleck, by Sir Sherston Baker, Bart., p. 18. London, 1878.

Reverting to our original proposition of the "Influence of the Geographical and Social Peculiarities of the United States upon its Military Service," and especially upon the duties of its Medical Staff, it becomes apparent that this influence could not be limited solely to the creation or transformation of civilians into Military and Medical Officers, but, that a rank and file would be obtainable, remarkable for its intelligence and adaptation to service, as compared with ordinary soldiers. In commenting on this fact, the late Lieut.-Gen. Grant said,* "The ingenuity of the Yankee soldiers was equal to any emergency, and I found volunteers in the ranks and among the non-commissioned officers, prepared to meet every call for aid, whether professional or mechanical. Many could run a Grist Mill, Steam-engine or Locomotive, build bridges, lay down railroads, erect houses and make excellent cooks." Thus surrounded by intelligent and educated soldiers who were often skilled mechanics previous to enlistment, our Surgeons readily obtained an excellent Ambulance Corps, and reliable Nurses, finding many capable of constructing a variety of appliances for the treatment, transportation and care of the sick and wounded, by land and water, thus contributing to the many Hospital cars and boats that are pictured in the Surgical History of the Rebellion by Surgeon Otis of the Army, and many of which can be seen in Washington in the Army Medical Museum.

The limit of time assigned me on this occasion does not permit more than this very brief allusion to such an extended and varied subject as has been suggested for your consideration; but it may suffice to explain the presence of many in this Section not now in the Service as Military Surgeons, as well as the absence in the United States of the large standing armies usually seen in Europe. Freed from entangling political alliances, the necessity for such an army in the United States, does not exist, and as has been well said,† "the genius of our political institutions and the settled convictions of our people forbid the maintenance among us of large standing armies. They are justly dreaded as productive of useless and wasteful expenditure; injurious to the habits and morals of the people, and dangerous to public liberty." The testimony of the present head of our Army also shows‡ "that we do not need such an army, as this is a country where every man is intelligent enough to take up a musket and learn the manual of arms at short notice."

The Military Surgeons of the United States being fortunately limited in their experience until the late War, were necessarily largely indebted to the distinguished Surgeons of Europe for their knowledge of the precepts of Military Surgery. The names of Hennen, Larrey, Guthrie, and many of a later period equally well known as authority on the surgery of the field, and some of whom will soon favor the Section with the results of their recent experience § tend to show how much European Military Surgery has had to do in moulding the professional opinions of Army Surgeons in the United States; though our late War furnished our Medical Staff with an opportunity of reciprocating this Professional obligation, and of yielding abundant fruit in return for the good seed which Europe sowed in former years. The valuable and extended treatises on Military Surgery and Medicine, issued by our Government, as "The Surgical and Medical History of the Rebellion in the United States," testifies to the fact, that the sound precepts uttered by European surgeons at the commencement

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* Memoirs of Lieut.-Gen. U. S. Grant.

† Address by Major-General B. F. Butler, at West Point, N. Y., 1839.

‡ Lieutenant-General Phil. Sheridan, U. S. A., in *N. Y. Tribune*, April 27th, 1887.

§ Longmore, Esmarch, and others.

of this century, though apparently dormant for years, had not lost their vitality, but contained a germ that like the mustard seed in the Parable, has grown and expanded, until all nations can enjoy and benefit by its growth and rest under its scientific shade.

I have thus imperfectly indicated some of the peculiarities of the Medical service of the United States Army, as they might appear to the European observer, and shown how the late war modified the usual relations of civil and military surgeons. Both now unite in this Section in the endeavor to alleviate the evils resulting from war.

Among the important subjects to be discussed, that of Asepsis, Antisepsis, and the influence of the Atmosphere upon wounds, is one that attracts attention everywhere and has created in the United States as well as in Europe, a new era in Operative Surgery. It will receive full consideration by those of extended experience and sound judgment. One of the lessons learned in the late War in this connection that will hereafter be discussed was, that wounds and disease are better treated in a Hospital Tent than in any house-like structure, no matter how carefully built and ventilated, because the walls of the latter absorb fetid and poisonous exhalations and subsequently give them back to the atmosphere, it being conceded that the fresh air of Heaven, even without a shelter tent, and subject to our great climacteric changes, is less injurious to the patient, if properly clothed, than the air breathed in the best Hospital building. Although many thousands of dollars were spent by our Government in the construction of Military Hospitals, models of which are to be seen in Washington, yet experience of the advantages of Hospital tents was so well settled that it is stated in the Medical and Surgical History of the Rebellion* "that wounded treated under Canvas, did better in every way and recovered sooner, than those treated in the large permanent hospital." A paper on the Hospital Tent for a Depot Hospital embracing over 12,000 patients, and another on "Huts," will be hereafter read.

In connection with the subject of a pure atmosphere, it seems appropriate to allude to the Æsthetic, as well as Hygienic, effects obtainable in a Hospital structure [when necessarily occupied] from the influence of growing and especially flowering plants in modifying the Air of a ward; the respiratory action of the leaves of plants, as is well known, taking Carbonic Acid gas from the atmosphere, whilst the flowers and odorous plants furnish Oxygen and Ozone, the latter of which, as has been demonstrated by the wonderful work of Pasteur, destroying or weakening Microbes or poisonous germs, and attenuating them so that disease from their action can be prevented. We of the Medical Profession in the United States deeply regret his enforced absence from this Congress, and from the expression of our appreciation of his remarkable discoveries.

Before closing, permit me to call the attention of the Section to the results recently obtained in Medicine and Surgery from the use of Electrical Instruments as aids to Diagnosis.

As electrical telegraphs are now a portion of the armament of all armies in the field, and regularly educated electricians constitute a portion of each Army Corps, with the view of keeping up communication with the heads of Government [as in the instance of the battle of "Tel-el-Kebir," where the news of the victory was transmitted to Her Majesty, the Queen of Great Britain, in forty-five minutes after the result], electrical batteries, etc., are readily obtainable by the Medical Staff.

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*The Medical and Surgical History of the Rebellion, Part 3, Vol. 2, Surgical History, p. 922, 2d issue, Wash., 1882.

With the numerous miniature electrical or incandescent lamps all are familiar, the cavity of the mouth being so illuminated as to show a shot in the substance of the cheek, whilst the gastroscope enlightens the cavity of the stomach. Although also probably known to many of those present, I have thought that attention may be properly called to the benefits obtainable in Diagnosis from the Induction Balance and the Telephonic Probe, both of which can be seen in Washington. The new electric probe of Trouvé, which vibrates on touching a ball, is also worthy of mention.

Another new invention termed the "Thermoscope" or "Thermopile" measures and indicates the temperature of the body in Fever, and promises to enable the surgeon sitting in his tent or office, to take the temperature of an important case some distance from him, and then, through the telephone, direct the nurse what to do, without leaving his seat,* and it is even suggested that an alarm contrivance can be made to call up the nurse whenever the patient's temperature reaches the danger point, as is now done in fire alarms in store-rooms, or a hot boiler wanting water.

It has also been suggested by Mr. Sumner Tainter's curious combination of Phonograph and Telephone or the "Electric Phonograph," that the reader of a paper in a Medical Congress can hereafter have his thoughts recorded on a properly prepared iron disc, and when invited to read it, instead of taking a trip across the Ocean, will forward his Disc, which being connected with the speaking telephone, can be heard by the audience as well as if the writer was near and spoke through the telephone.† A serious objection to this arrangement is, that we should be deprived of the pleasures due to social intercourse at the place of meeting and the magnetic influence of the speaker.

The Programme as printed for each day, will enable you to know the subjects of Papers and Discussions to be presented to the Section, and I will no longer trespass on your patience and keep you from the consideration of the valuable treatises that will be offered by the matured experience of those who are to participate in our scientific work.

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* Those desirous of details can consult "The Age of Electricity from Amber Soul to Telephone," by Park Benjamin, PH.D. New York, Scribner, 1886. † Opus citat.

# PAPERS

## READ BEFORE THE SECTION.

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## ON A SHORT SCHEME FOR WATER ANALYSIS IN THE FIELD.

### D'UN PROCEDE FACILE POUR L'ANALYSE DE L'EAU EN CAMPAGNE.

### EINE KURZE METHODE ZUR UNTERSUCHUNG DES WASSERS IM FELDE.

BY FRANCIS PATRICK STAPLES, M. K. Q. C. P. IRELAND, M. R. C. S. ENGLAND.
Surgeon and Major in Her Majesty's Army, Aldershot Camp.

Water analysis in the field is not unfrequently regarded as more or less of an impossibility.

Nevertheless there are occasions, such as the selection of encamping grounds, or the suspected fouling of the sources of supply of standing camps, when the necessity for an examination would arise, and when such examination might be demanded by the Royal Engineer Department, or by the General officer in command. The Sanitary Medical Officer of the army, or division of the army would have to give an opinion, and to enable him to do it in a satisfactory manner (having regard to the exigencies of the service) the accompanying portable case of re-agents and apparatus has been constructed.

The scheme which they are intended to work out includes a qualitative estimation of organic impurities and of the several compounds into which nitrogenous matter is converted by oxidation, the quantitative estimation of the alkaline chlorides and also the estimation of the total *hardness*. The portable case is 19½ inches, by 11 inches, by 7 inches, and is strongly made of board—lined—and with an outer covering of leather. It is provided with straps and a handle, so that an attendant can carry it.

It is divided within into two principal compartments, viz. : No. 1, containing the chemical re-agents in bottles, and the other, the chemical apparatus. The latter is again subdivided, for facility of arrangement, by means of a tray.

The contents are as follows, viz. :—

No. 1 compartment contains—Standard solution of permanganate of potassium. Solution of chloride of ammonium. Standard solution of sodium hydrate. Standard solution of nitrate of silver. Standard soap solution. Standard Nesler's solution. Solution of gold chloride. Solution of monochromate of potassium. Solution of iodide of potassium. Starch. Alcohol. Solution of sulphuric acid. Aluminium metal. Bottles for working out the soap test for total hardness. Test tubes 6, Receiving glasses 2. Spirit lamp. Cases of litmus paper.

No. 2 compartment (lower part)—Burettes (3), burette stand, cleaning brush, filtering paper. Upper part—Cubic centimeter measures of various sizes, 6 India rubber pipettes and clips for the burettes.

# ON THE NECESSITY OF A MORE CAREFUL EXAMINATION OF THE WATER SUPPLY OF MILITARY POSTS WHERE AN UNUSUAL AMOUNT OF SICKNESS PREVAILS, AND EXAMINATION OF HYGIENIC SURROUNDINGS.

## DE LA NÉCESSITÉ D'UN EXAMEN PLUS PARTICULIER DE L'EAU, ET DES CONDITIONS HYGIÉNIQUES DES POSTES MILITAIRES DONT L'ÉTAT SANITAIRE EST MAUVAISE.

## ÜBER DIE NOTHWENDIGKEIT EINER SORGFÄLTIGEREN UNTERSUCHUNG DER WASSERVERSORGUNG VON TRUPPEN-PLÄTZEN, IN WELCHEN EIN UNGEWÖHNLICHER GRAD VON KRANKHEIT HERRSCHT, UND DIE UNTERSUCHUNG DER HYGIÄNISCHEN UMGEBUNGEN.

BY MORSE K. TAYLOR, M. D.,

Major and Surgeon U. S. Army.

The history of army sanitation in this country is very interesting to those who will study it. Under scarcely any other conditions in life are all the circumstances which go to make up the sum of what we call a healthy or an unhealthy location so much within the reach of careful investigation, as in the army. It is, therefore, natural to suppose that everything pertaining to this subject would receive careful attention by those most directly interested, and that every agency which affects the health and efficiency of a command would be inquired into. This supposition, however, is not always, we regret to say, well founded, and the fact that it is not, induces us to bring the subject up for discussion at this time.

Army life, in a measure, is like a sealed book to the public, and in so far as anything relating to the health of the army from 1874 to 1885 is concerned, the expression is a veritable reality. The meagre reports issued from the Surgeon-General's office from year to year, gave no insight into the methods of work in the Medical Department, and none but those immediately within the circle could understand the many discouragements under which the medical staff labored during this period. Time will not permit going into a detailed statement of the circumstances; suffice it to say that the authority of Post Commanders was such, that the recommendations of Post Surgeons, however important, received little consideration, unless these officers chose to give it.

The law, the regulations and the orders, required medical officers to make frequent inspections of everything relating to the sanitary condition of their respective posts; the water supply, the food, its preparation and service, the clothing of the men, their personal habits, condition of the barracks and bedding, police of the grounds, and everything that would be likely to affect the health injuriously, and to report in writing to the commanding officer. There were no orders, however, requiring this officer to take any action on such reports other than in his own discretion, and in the exercise of this discretion, it not unfrequently occurred that he paid no attention to them, or tore them up and threw them into the waste-basket. If such reports called attention to the unsanitary condition of the company barracks, or to that of the post at large, the interested officers looked upon such action as a reflection on themselves, and in the light of a piece of meddlesomeness, which they took prompt occasion to resent. As a result, much ill feeling was engendered on both sides, the one, in that his neglects had been made public and criticised, often by a subordinate in rank, the other that his official action had been treated with contempt, and in some degree made a personal matter. The result of all this was just what one might expect. The sanitary condition of the army was little, if any, improved. The self respect of the medical officers forbade their taking action when no good came of it, and when if they

did act, it would be taken ungraciously; and the records show that there was no improvement in the health of the army in all these years. In fact there was more sickness during the five years from 1880 to 1884, both inclusive, than the preceding five years, by 5 per cent. The death rate, however, which came more within professional influences, was reduced 12 per cent.

In 1885 a radical departure was taken. General Orders No. 78, dated July 15th, of that year, gave new instructions for making sanitary reports by the Post Surgeons, and the action to be taken on them by the Post Commanders. The latter's discretion to do as he pleased with these reports was taken away.

This order requires the Post Surgeon to make a careful inspection, at least once a month, into everything relating to the sanitary conditions, as before, and to report in writing to the Commanding Officer any neglects which exist, and to make such recommendations as he thinks proper to promote the general health. On this the Commanding Officer is required to make his endorsement, stating what action he will take to carry out the recommendations of the Surgeon, or his objections thereto; when he is to return the paper to the Post Surgeon, who then makes an official copy of the report and endorsement thereon, and forwards the same, through the regular channels, to the Adjutant General of the Army, from whom it goes to the Surgeon-General. In this course the Post Commander has no discretion in forwarding the Post Surgeon's report, and he must take some action on it. Any portion he may disapprove, he may state his reasons therefor, by endorsement or by a special report. By this means the Department and Division Commanders, the General of the Army and the Surgeon General are fully advised as to the sanitary conditions of the several posts; while it makes the Post Commanders very circumspect in their treatment of the Surgeon's action; and now for two years, the regulations which charge the Surgeons with the supervision of the hygiene of the army have had a practical force they never had before. With this, there has been a radical change in the sentiments of the army in respect to the functions of the medical staff. The position of the Medical Officer as a sanitarian is one of respect, for behind him is a power which the Line understands is to be obeyed.

For the limited time that this order has been in force, the results have been salutary. The Post Surgeons have been encouraged in their efforts, and the Line have been inspired, in a degree, to take more interest in military sanitation, and with a far better feeling toward the Staff. There is more unity of action now between these branches of the service, in respect to the health of the army, than ever before, and the good results are already apparent. Compared with the average of the preceding ten years, the sick rate for the past two years, ending June 30th, 1886, was less than 80 per cent. of the average of the former period, and the death rate a fraction over 71 per cent.

All this may seem foreign to the subject we are to discuss, yet we think it justified as a preliminary statement, going to explain the reasons why there was no improvement in the health of the army from 1870 to 1885, notwithstanding, by the opening of railroads, the facilities for obtaining fresh supplies and the necessary things to promote the comfort and welfare of the troops had vastly increased; and as going to show, in the brief time the late orders have been in force, the benefit arising therefrom, and indicating further, the work still to be done, and the method of its accomplishment.

Sickness in the army is vastly greater than it should be. The prevalence of malarial fevers, enteric fever, and dysentery, at stations where we should least expect them, is far too common. The rate of malarial fevers to the mean strength of the army was 12 per cent. for the past year; but we find the ratio at some of the stations is more than 170 per cent.; and at 14 stations out of 139 in the army, these fevers exceed 30 per cent. of the mean strength. Enteric fever and dysentery are not necessarily a constant quantity in the army. These are preventable diseases and arise from causes well understood. That they have occurred to the extent of 156 cases in 1885 and 76

cases in 1886, though a great improvement on the past, is an indication that even under the present efficient hygienic methods there is still something wanting. In order to show what this is, it is necessary to consider briefly the circumstances under which these and the malarial fevers prevail. It will be better, however, to speak of the malarial fevers first, as they are the most common.

There were 36 stations where malarial fevers exceeded the average for the year 1886, and it is remarkable that many of these points are situated in regions, and at altitudes which are popularly supposed to be comparatively free from these diseases.

Take Fort Lewis in southern Colorado, for instance, at an elevation, according to a late authority, of 8000 feet. The malarial fevers for 1885 were 86 per 1000 and in 1886 were 116 per 1000 M. S. The water supply is from a river rising in the mountains and running through the reservation. The average sick rate for the two years was 2068 per 1000, 20 per cent. of which were neuralgias and headaches. In 1885 its sick rate exceeded that of Fort Sill.

Fort Stanton, New Mexico, is situated at an altitude of 7500 feet and 75 feet above the Rio Bonito, on which it is located. For the year ending June 30th, 1885, the malarial fever cases amounted to 348 per 1000 M. S., while for 1886, there were but very few; the rate being but 20 per 1000. The sick rate for 1885 was 2769, making it one of the most unhealthy stations in the service, but in 1886 it was reduced to 974 or nearly one-third.* From 1870 to 1874, the average was 70 per 1000 of these fevers, the Intermittent form being the principal.†

The water is taken from the river by an aqueduct tapping the stream three-fourths of a mile above. It has a rain-fall of about twenty inches. Intermittent fevers have occurred at this post frequently from its establishment in 1862, and have been clearly of local origin.

Fort Bayard, New Mexico, at an altitude of 6040 feet, had 297 cases of malarial fever per 1000 M. S., the past year, and for the preceding year 130. It is in a valley surrounded by granite hills and with "an exceedingly dry climate," according to its medical history. In 1872 there were twenty-eight cases of intermittent fever and twenty-two cases of remittent fever; and in 1873, 60 cases of intermittent fever, and in 1874, thirty-two cases of intermittent, in a command of a little less than 200, an average rate of twenty-four per cent. The water supply is from a spring which runs through a swamp. The reports show that it has been planked up and the water filtered. In 1885, however, there were thirty-five cases of malarial fever in a mean strength of 158, over twenty-two per cent. with a mean sick rate of 1405.‡

Fort D. A. Russell, Wyoming Territory, has an altitude of 6021 feet, and for the year 1885, the malarial cases reached 390 per 1000, while for the year 1886, the rate was but ninety. It is situated fifty feet above Crow Creek, a branch of the Platte river. The water supply is from this creek and taken from below the post. The sick rate in 1885, was 1357, but was reduced to 871 the past year.§ Intermittent fevers are common.

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* "It would not be profitable now to reproduce what I have so often written before, to establish the fact that this command has been for a long time compelled to subsist on a solution of filth, for its drinking water. A well has been sunk on the bank of the Bonito. Reduction of sick rate over 65 per cent."—Post Surgeon's report, February, 1885.

† In 1873, the intermittent fever rate equalled 30 per cent. of the command.

‡ Post Surgeon reported February, 1886, "Danger of contamination of water supply from cattle roaming and dying on the reservation."

§ "A new water supply obtained by sinking a well." Post Surgeon's report, October 31st, 1885. The sick report shows a reduction of over 36 per cent.

Let us take Fort Davis, in northern Texas, close to the southern border of the staked plains. Its elevation above the sea is 4928 feet. It is situated at the outlet of a cañon and bordered on three sides nearly by hills from 200 to 300 feet high. The water supply is from Olympia creek, which flows through the cañon, and by a spring issuing from one of the hills. In regard to this spring, the Post Surgeon, in 1874, reported that it had been condemned for potable purposes, but he could not understand why. For many years past, the post has been notorious for its low forms of malarial fevers and dysenteries. In 1885, the fevers prevailed to the extent of 178 per 1000, and of dysentery, of 140. For 1886 the fevers rated at 209, and the dysenteries at 178 per 1000, making these cases jointly reach nearly thirty-nine per cent. of the command. Various theories have been propounded by Post Surgeons to account for this excessive sickness; but all these have now settled down to the water, and measures are being taken to supply the post with distilled and aerated water for potable use.

Again, take Fort Bridger, Wyoming Terrritory, at an altitude of 6670 feet, where the malarial fevers reached 220 per 1000 in 1885, reduced, however, to 90 per 1000 in 1886. This is the post at which Surgeon Charles Smart, U. S. Army, made his investigations and published them in 1878. The post is located in the valley of the Black Fork of the Green river. The stream divides a short distance from the post into five branches, one of which runs through the parade, and the buildings are but a few feet above the water line. The water supply is from these branches, which run near the dwellings, in open ditches. Surgeon Smart, while speaking of malarial fevers, says: "no intermittents originate here;—the type remittent is common." It is generally known as "mountain fever," with a tendency to a typhoid condition. This being so, it differs materially from Forts Stanton and Russell. The average sick rate was 1932 for a series of years. In 1885, the miasmatic fever rate was 237, but in 1886, it was reduced to thirty-nine per 1000.

I will now call attention to two posts, the climatic conditions of which are so utterly at variance and in striking contrast with the current ideas, in respect to the origin of malarial fevers, as to be of special interest.

Fort Lyon, Colorado, at an elevation of 3800 feet, had for the year 1886 a sick rate of malarial fevers of 238 per 1000. It is situated on a sandstone bluff overlaid by barren sand and gravel and thirty-six feet above the Arkansas river. The water is furnished from the river by an aqueduct starting at a distance of six miles above. In 1874, the Post Surgeon reported that when the water is short, there is a decided increase in the "sickness from malarial complications." The climate here is exceedingly dry, the rainfall being but eleven inches and the average relative humidity fifty-seven per cent. Admission rate 1189 for 1886, against 1687 for the year before.

Fort Bliss at El Paso, Texas, has an altitude of 3764 feet. It is located on the east bank of the Rio Grande about ten feet above high water and on ground mostly consisting of coarse gravel, absolutely destitute of vegetation. The climate is very dry, the annual rainfall being but about thirteen inches and a relative humidity of forty-nine per cent. The Post Surgeon reported in 1874 "that when the river is low, malarial fevers are very prevalent." In 1886, the malarial fever rate was 147; but in 1873, they occurred at the rate of 871 per 1000, while in 1874 the rate was 547 per 1000. Time does not admit of going into further details. What I wish to invite especial attention to, is this, namely: *that high altitudes, cool climates, dry atmospheres, barren and dry soils conjoined, do not give immunity from malarial fevers;* that we must look in other directions for the cause, and, that in every case cited, where these fevers prevail under the physical conditions named, the *water is taken from rivers or creeks* which are subject to being contaminated with organic matters in a state of decay. The notorious stations of Forts

Gibson,* Reno, Supply and Sill, prior to the autumn of 1884, all in the Indian Territory, have been taking their water supply from streams known to be loaded with organic matters arising from the wash of extensive prairies; from Indian camps and cattle herds; especially so during the summer seasons, when they run nearly dry, and when the essences of disease may be said to be concentrated. The stations on the lower Rio Grande are supplied by water from that stream still more obnoxious. The character of this river is thus described by Lieut. Col. E. P. Vollum, Surgeon U. S. Army and Medical Director of the Department of Texas, in a late note to the writer: "In truth, the water of the Rio Grande is unfit to drink by man or beast. From El Paso to the mouth at least, it is a filthy, muddy stream all the year round. It is so dense with earthy matters that the sun's rays cannot penetrate it; and if, as has been held, the solar influence acts as a purifier upon noxious matters contained in water, this benefit is reduced to a minimum in this case. During drought seasons, such as have prevailed on both sides of the river for the past three years, numberless cattle reach the banks in a famished condition and die stalled in the mud, their carcasses to decompose and float away, to commingle with the drainage that flows from the cattle counties for 1800 miles." This is the water that has been the chief source of supply for the troops stationed in this region for years past. The instances given are not the only ones, however, that might be named. It is safe to say, that not less than one-third of our military posts are supplied with impure water, and they are scattered from one extreme limit of this country to the other. At Fort Assinniboine, in Montana, close to the Canadian line, the malarial fever rate was nearly twelve per cent. in 1885, and ten per cent. in 1886, of the mean strength,† while Fort Walla-Walla, in Washington Territory (at which post the water supply has been known to be of the vilest character for years), has been a breeding place for malarial and enteric fevers and dysenteries almost continuously from its establishment in 1856.

It is not our purpose to go into a general discussion of the question as to whether or not, water is a source of malarial infection, for time is too limited; but rather to call attention, in the briefest manner, to such general facts as are the outcome of army experience and observation; leaving to others the consideration of their importance. We have some evidence of a very positive character bearing on this subject, however, which we will briefly present. Near the close of last year, an ice machine combined with a distilling, aerating, and filtering apparatus, was erected at Fort Ringgold, on the lower Rio Grande, for the use of the post, and since then only purified water has been used for potable purposes. The result of this change is most remarkable and I will barely summarize it here. A tabular statement is appended. (See Table I, p. 30.)

From January to July (both inclusive), of 1885, there were 31 cases of intermittent and remittent fevers, and 27 of intestinal disorders, embracing dysenteries, diarrhœas and colic. For the corresponding period this year, to wit, from January 1st to July 31st, there have been but 15, or less than one-half of miasmatic fevers, and the intestinal disorders have been reduced to 5, or less than one-fifth, while dysentery was entirely eliminated. The days lost were in the proportion of 510 with river water, to 300 with distilled water; and the severity of the attacks will be indicated by the fact that for the former period the length of time the men were on the sick report on an

* "Water taken from Neosho river and leaky cisterns contaminated with sub-soil drainage."—Letter of Capt. Charles B. Byrne, Assistant Surgeon U. S. A., Post Surgeon, dated July 30th, 1887.

† Post Surgeon reported August, 1886, "water very offensive." November, 1886, "water dangerous; should be boiled." "Diarrhœa and dysentery prevail; water should be boiled," September, 1886.

average was 8.21 days while for the latter only 2.87 days. This short period of seven months, may be thought insufficient from which to draw general conclusions; but this may be said in its favor, that nothing like it has occurred in the history of the post, and, as Surgeon Vollum remarks, "it is a good showing for the first experiment in the army of furnishing pure water in the place of that supplied by nature;" to which remark we may add, and that contaminated by man.

The effect of a change from river or creek water, to good spring water at Fort Sill, in the autumn of 1884, has also an important bearing.

This post has been noted for its unhealthy conditions since its establishment in 1869. In 1876 its sick rate was 3911, and in 1877 it was 3067, while for 1882 and 1883 the rate was 2239 and 2158 respectively. Miasmatic fevers and diarrhœas were the prevalent ailments. The water was taken from Medicine Bluff creek, a stream rising in the Wichita mountains and running through the post, until 1884. It was considered a mountain stream, but it ran nearly dry every season, the water standing in pools, from one of which, near by, the water was hauled in wagons. In the autumn of 1884 spring water was obtained, of excellent quality, and with that there was a very remarkable change in the health of the garrison. The following statement of all cases of sickness, exclusive of injuries, for the fiscal year ending June 30th, will indicate the improvement:—

| Years. | Rate per M. |
|---|---|
| 1883, '84 | 1076 |
| 1884, '85 | 913 |
| 1885, '86 | 708 |
| 1886, '87 | 512 |

The foregoing statements respecting Forts Ringgold and Sill, point unerringly to water as a source of malarial disease. All the conditions in both commands remained unchanged in respect to climatic conditions, the food of the men, their military duties, and everything relating to influences affecting the health, except the water.

The prevalence of enteric fevers at certain stations deserves especial consideration, but we can refer to only two. Jefferson Barracks, situated on the Mississippi river, three miles below the city limits of St. Louis, is the general recruiting depot for the cavalry. It has above it a densely populated shore line of about thirteen miles, from which there is discharged into the river the sewage of about 500,000 people and nearly 3000 manufacturing establishments. The water supply is taken from the river in front of the post. It has been noted for years for the prevalence of enteric and miasmatic fevers and intestinal disorders. Within two or three years past, most earnest and efficient efforts have been made by the Post Surgeon, to improve the sanitary condition, and to a certain extent, with excellent results; but in times past it has scattered (as we know of our own knowledge and from the numerous reports of other officers) and now scatters, and will continue to scatter, its infected victims throughout the military stations, so long as the water supply remains as it is.

The unhealthy condition of this post becomes more apparent when we compare it with the other two great depots for recruits; namely, David's Island, New York Harbor, and Columbus Barracks, Ohio, where the recruits arrive under identically the same conditions. To this end we will take only the record of the past two years, which are the most favorable in its history.

| | *Jefferson Barracks.* Rate per M. | *Columbus Barracks.* Rate per M. | *David's Island.* Rate per M. |
|---|---|---|---|
| Malarial Fevers | 917 | 420 | 148 |
| Enteric Fever | 82 | 13 | 2 |
| Typho-malarial | 27 | 0 | 0 |
| Total | 1026 | 433 | 150 |

Again, Fort Wayne, four miles below Detroit, has had enteric fever appearing frequently for years past. It has a densely populated shore line, commencing within a mile of the post and extending up the stream for seven miles, taking the drainage of fully 200,000 inhabitants and 1000 manufactories.

While on this station, we endeavored to ascertain the causes leading to the presence of enteric fever, and came to the conclusion that they were from two sources—a beastly system of barrack drainage, and the contaminated water from Detroit City discharging into the shoal water along the river banks, thence to flow in front of the post. Of the eight stations in the St. Lawrence drainage system, this is the only post where enteric fever is of yearly occurrence; we might say, a constant quantity.*

Here we must stop, though but on the threshold of the subject.

Not only the water supply, but the sub-soil drainage, the improvement of the surrounding lands, the sewer system, water storage, (which has unquestionably a source of infection) barrack cleanliness, and ventilation, are all subjects for further investigation, and which should be inquired into in the most systematic manner. To this end, these investigations should be made a separate branch of the service. Only those skilled in sanitary science, those who have had experience in studying the subtle agencies affecting public health, and whose acquirements give force to their opinions, should be assigned to this duty; and wherever an unusual amount of sickness prevails, there, should they be sent promptly, to investigate the cause, while the circumstances are fresh in the memory and facts are easily ascertained. All Post Surgeons are not qualified for this duty. Some take only a perfunctory interest in such matters, while others are absolutely disqualified by want of tact in chemical manipulation, or in that keen perception of color tests so essential in water analysis.

We need a Sanitary Board not wholly made up of Medical officers, but from the Line and Engineers, in order that every phase of these complex questions may receive due consideration.

We cannot hope to eradicate enteric or miasmatic fevers wholly, so long as "the sentry walks his weary rounds," traveling an average of sixteen miles daily, one-half of which is in the night, when the malarial forces are the most active; but we can hope for a material lessening of the number of cases, a mitigation of their intensity, and a shortening of their duration. Efforts to this extent, modern intelligence approves, humanity prompts, the efficiency of the service demands, and the honor and good faith of the nation make imperative.

## DEBATE.

Deputy Surgeon General MARSTON, of Her Majesty's Army, said that he had listened to the paper with very great interest, containing, as it did, a number of facts and observations that did not admit of criticism.

He thought that the facts connected with several outbreaks of disease, notably of enteric fever, proved that drinking water was a common vehicle in the spread of such diseases. As regards malarial disorders, he cited some instances within his own experience.

There was really often nothing short of an experiment on individuals, to enable you to say whether water was or was not a vehicle of disease. The presence of organic impurities enabled you to say, chemically, that the water was *probably*, but not certainly, dangerous for drinking purposes.

He dwelt upon the influence of exposure to freshly turned up earth, in China and

* Post Surgeon's report, May, 1886; "apparently good; will be examined."

elsewhere, in causing ague and malarious disease. He also related an instance of an outbreak of *Goitre* dependent upon the character of the water supply.

In India, where malarious disease was very common, vile water was ordinarily used. Dr. Marston dwelt upon the influence of exposure to night air in this respect.

As regards a Sanitary Board, it was essential to have it partly composed of Engineering officers, acquainted with the requirements of Sanitary Science and the practical application of the laws of Sanitary Engineering and Drainage.

Surgeon JOSEPH R. SMITH, U. S. Army, in discussing the papers on water supply and analysis said :—

It is not always easy for the Surgeon to detect impurities in water, and we will better appreciate this, when we reflect that with all the appliances of our best equipped chemical laboratories, it is often a matter of difficulty to decide positively, whether water is polluted or not. Foreign matters may be detected, and use prove them innoxious; and pollution may exist in water, and yet fail to reveal itself to the chemist's art. The water may contain matter in a state of suspension, even when the microscope is our best means of examination. The water may be black and thick with this matter, and on standing a few hours the matter subside and leave the water potable. It is easy to test for chlorine and nitrogenous compounds, but not so easy when detected, to determine their quantity, and their mere presence is no proof of pollution; it is only a suspicious circumstance. Often it is useless for the army surgeon to make an analysis; the water must be drank, pure or impure; there is no other water to be had, and the thirsty soldier cannot be checked; he will rush to the water and drink, whatever may be done to prevent it. Finally, in such an instance as that of the location just below Detroit, on the river, even if the surgeon detects pollution and measures its amount, he cannot remedy it. No other water is available, and the surgeon cannot coerce the inhabitants of the city, or prevent their sewage flowing into the river.

Remarks were also made by Deputy Inspector General WM. HARRIS LLOYD, of the British Navy, who said :—

I quite concur in the views expressed by Dr. Taylor in his valuable and interesting paper, as to the necessity for the utmost vigilance as to the quality of water supplied to military posts and also to ships, in the latter of which the subject has come more under my own observation. I have often observed, in the tropics, that the period when malarial fever and dysentery most prevailed was at the commencement of the rainy season, when the water-courses got their first washing down, and I have always considered that the *materies morbi*, in whatever form it might be, was often brought down by the streams at these times. In view of late researches by the officers of the British Local Government Board, which have demonstrated the fact that water, chemically pure, has been undoubtedly capable of causing enteric fever, and that all available tests failed in giving any evidence of its deadly nature, it must, I fear, be allowed that, in the present state of our knowledge, an intelligent examination of the sources of the supply must be considered the most important means of safety we possess.

Nothing that I have said, however, is intended to detract from the importance of careful chemical testing of water for organic and other impurities.

## TABLE I.

**Statement Comprising the Prevalence of Miasmatic Diseases and Diseases of the Alimentary Canal, at Fort Ringgold, Texas, during a portion of the years 1886 and 1887. During 1886, Rio Grande water was used. During 1887, distilled and filtered water was used.**

*(Arranged from a Report of Wm. Fitzhugh Carter, Captain and Assistant Surgeon, U. S. A.; Post Surgeon.)*

| Month. | Number of Cases. | | | | | | | | | | Number Days spent on Sick Report. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Remittent Fever. | | Intermittent Fever. | | Dysentery. | | Diarrhœa. | | Colic. | | | |
| | 1886 | 1887 | 1886 | 1887 | 1886 | 1887 | 1886 | 1887 | 1886 | 1887 | 1886 | 1887 |
| January | ... | 1 | 4 | 1 | ... | ... | 2 | 1 | 1 | ... | 16 | 72 |
| February | 1 | 1 | 1 | 1 | ... | ... | 1 | 1 | 1 | ... | 20 | 50 |
| March | 1 | 2 | 3 | 2 | ... | ... | ... | ... | ... | 1 | 17 | 56 |
| April | 9 | ... | ... | 2 | ... | ... | 1 | ... | 1 | ... | 148 | 25 |
| May | ... | 1 | 5 | ... | 1 | ... | 6 | 1 | 1 | 1 | 128 | 20 |
| June | 1 | 2 | 4 | 1 | 1 | ... | 8 | ... | ... | ... | 129 | 46 |
| July | ... | 1 | 2 | ... | ... | ... | 2 | ... | 1 | ... | 52 | 31 |
| Total | 12 | 8 | 19 | 7 | 2 | ... | 20 | 3 | 5 | 2 | 510 | 300 |
| **Percentage of Sick to Command.** | | | | | | | | | | | | |
| January | ... | .71 | 2.20 | .71 | ... | ... | 1.10 | .71 | .56 | ... | .77 | .43 |
| February | .58 | .71 | .58 | 71 | ... | ... | .58 | .71 | .58 | ... | .46 | .43 |
| March | .71 | 1.70 | 2.12 | 1 70 | ... | ... | ... | ... | ... | .85 | .57 | .85 |
| April | 6.80 | ... | ... | 1.32 | ... | ... | .75 | ... | .75 | ... | 1.66 | .26 |
| May | ... | .64 | 3.73 | ... | .75 | ... | 4.47 | .64 | .75 | .64 | 1.94 | .38 |
| June | .75 | 1.30 | 3 | .65 | .75 | ... | 5.97 | ... | ... | ... | 2.09 | .39 |
| July | ... | ... | 1.44 | ... | ... | ... | 1.44 | ... | .72 | ... | .72 | .13 |
| Total | 8.84 | 5.73 | 13.07 | 5.09 | 1.50 | ... | 14.31 | 2.06 | 3.36 | 1.49 | 8.21 | 2.87 |

## TABLE II.

**Table showing the Per Cent. of Malarial Fevers at Posts of an Altitude of 3000 Feet or over, for the Years 1885 and 1886.**

| Posts. | Altitude. | 1885. | 1886. | Posts. | Altitude. | 1885. | 1886. |
|---|---|---|---|---|---|---|---|
| Apache | 5,020 | .06— | .08* | Lyon | 3,800 | .09+ | .24— |
| Bayard | 6,040 | .13— | .30 | Maginnis | 4,320 | .11— | .08 |
| Bidwell | 4,680 | .12+ | .04+ | Marcy | 6,846 | .03+ | .03 |
| Bliss | 3,600 | .05 | .15 | McDermitt | 4,700 | .00 | .00 |
| Bowie | 4,826 | .31+ | .03 | McKinney | 5,175 | .08+ | .07 |
| Bridger | 6,643 | .22+ | .09 | Meade | 3,624 | .18— | .03 |
| Custer | 3,040 | .08— | .01 | Missoula | 3,375 | .05+ | .02 |
| Davis | 4,928 | .17+ | .21 | Reno | 3,200 | .18— | .41 |
| Douglas | 4,904 | 2 cases .05+ | .00 | Robinson | 3,675 | .13+ | .08 |
| | | | | Russell | 6,021 | .39— | .06 |
| Ellis | 5,800 | .03+ | .06 | Shaw | 3,600 | .03— | .04 |
| Elliott | 3,674 | .22+ | .06— | Sidney | 4,326 | .05— | .02 |
| Fred Steele | 6,500 | .06 | .11 | Stockton | 4,950 | .11+ | .11 |
| Grant | 3,859 | .16— | .18 | Union | 6,700 | .10+ | .03 |
| Halleck | 6,000 | .10 | .07 | Verde | 3,160 | .08+ | .03 |
| Huachuca | 5,173 | .31 | .12 | Washakie | 5,462 | .17— | .00 |
| Klamath | 4,200 | .15+ | .09 | Whipple Barracks | 5,340 | .14+ | .08 |
| Laramie | 4,241 | .05+ | .02 | Wingate | 6,649 | .05— | .09 |
| Lewis | 8,000 | .08+ | .12 | | | | |

# TABLE III.

## MALARIAL FEVERS.

**A Tabular Statement of the Prevalence of Malarial Fevers at the Several Posts in the Army of the United States, for the years 1885 and 1886, giving the rate per 1000 of mean strength, and altitudes of Stations in feet above the Sea.**

*(Compiled from Reports of the Surgeon-General U. S. A., for these years.)*

| Posts. | 1885. | | | | | 1886. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Altitude. | Mean Strength of Command. | No. of Cases. | Ratio per 1000. | Remarks. | Mean Strength of Command. | No. of Cases. | Ratio per 1000. | Sum of the Rate per 1000 for 2 Years. | Remarks. |
| Adams, R. I. | 30 | 234 | 2 | 8 | | 237 | 2 | 8 | 16 | |
| Abraham Lincoln, Dak. Ty. | 1,914 | 179 | 12 | 67 | | 202 | 1 | 5 | 72 | |
| Alcatraz Island, Cal. | 85 | 107 | 2 | 19 | | 105 | 0 | 0 | 19 | |
| Angel Island, Cal. | 85 | 141 | 2 | 14 | | 133 | 1 | 7 | 21 | |
| Assiniboine, Mont. Ty. | 2,650 | 475 | 55 | 116 | | 473 | 46 | 97 | 213 | |
| Augusta Arsenal, Ga. | 600 | 22 | 1 | 45 | | 21 | 1 | 47 | 92 | |
| Apache, Ariz. Ty. | 5,020 | 224 | 14 | 62 | 5 enteric. | 169 | 13 | 76 | 138 | |
| Barrancas, Fla. | 30 | 122 | 23 | 188 | | 93 | 22 | 236 | 424 | |
| Benicia, Cal. | 85 | 124 | 25 | 201 | | 122 | 7 | 57 | 258 | |
| Bayard, N. M. | 6,040 | 275 | 37 | 127 | 2 enteric. | 229 | 68 | 296 | 423 | 1 enteric. |
| Bennett, Dak. Ty. | 1,510 | 56 | 0 | 0 | | 50 | 0 | 0 | 0 | |
| Bidwell, Col. | 4,680 | 90 | 9 | 100 | | 90 | 4 | 44 | 144 | |
| Boise Barracks, Idaho Ty. | 2,880 | 103 | 6 | 60 | | 104 | 6 | 57 | 117 | |
| Bliss, Texas | 3,764 | 97 | 5 | 51 | 1 enteric. | 95 | 14 | 147 | 198 | |
| Bowie, Ariz. Ty. | 4,826 | 150 | 47 | 313 | 1 enteric. | 136 | 4 | 29 | 342 | |
| Brady, Mich. | 600 | 78 | 2 | 25 | | 77 | 1 | 13 | 38 | |
| Brown, Texas | 50 | 99 | 32 | 323 | | 127 | 41 | 322 | 645 | 1 enteric. |
| Buford, Dak. Ty | 1,854 | 311 | 11 | 35 | | 313 | 3 | 9 | 44 | |
| Bridger, Wy. Ty. | 6,643 | 154 | 35 | 227 | | 158 | 14 | 89 | 316 | |
| Canby, Wash. Ty. | 14 | 66 | 1 | 15 | | 77 | 0 | 0 | 15 | |
| Clarke, Texas | 1,000 | 560 | 128 | 228 | 2 enteric. | 449 | 157 | 349 | 577 | 2 enteric. |
| Columbus Fort, N. Y. Harbor. | 25 | 183 | 12 | 66 | | 156 | 6 | 38 | 104 | |
| Columbus Barracks, O. | 740 | 330 | 55 | 166 | | 447 | 108 | 241 | 407 | 3 enteric. |
| Colville, Wash. Ty | ... | ... | ... | ... | | ... | ... | ... | ... | |
| Cœur d'Alene, Idaho Ty. | 2,198 | 292 | 22 | 75 | | 261 | 1 | 4 | 79 | |
| Custer, Mont. Ty. | 3,040 | 444 | 31 | 70 | | 471 | 7 | 14 | 84 | |
| Concho, Texas | 1,950 | 304 | 71 | 233 | 1 enteric. | 270 | 34 | 125 | 358 | |
| David's Island, N. Y. Harbor. | 25 | 345 | 28 | 81 | | 474 | 32 | 67 | 148 | 1 enteric. |
| Douglass, Utah Ty | 4,904 | 464 | 25 | 53 | 2 enteric. | 442 | 2 | 4 | 57 | 12 enteric. |
| Del Rio, Texas. | 0 | 58 | 10 | 172 | | 57 | 3 | 52 | 224 | |
| Davis, Texas | 4,928 | 437 | 78 | 178 | 1 enteric. | 275 | 57 | 207 | 385 | |
| Elliott, Texas | 2,700 | 173 | 39 | 225 | | 173 | 10 | 57 | 282 | |
| Ellis, Mont. Ty. | 5,800 | 133 | 5 | 37 | | 143 | 9 | 63 | 100 | |
| Frankford Arsenal, Penn'a. | 50 | 37 | 7 | 189 | | 36 | 7 | 194 | 383 | |
| Fred Steele, Wy. Ty. | 6,500 | 154 | 9 | 60 | | 124 | 13 | 104 | 164 | |
| Gaston, Cal. | 397 | 38 | 4 | 105 | | 39 | 0 | 0 | 105 | |
| Gibson, Indian Ty. | 600 | 96 | 144 | 1,708 | | 87 | 112 | 1,288 | 2,996 | |
| Grant, Ariz. Ty | 4,910 | 284 | 45 | 158 | 4 enteric. | 239 | 44 | 184 | 342 | |
| Hamilton, N. Y. Harbor. | 25 | 211 | 57 | 270 | | 198 | 19 | 95 | 365 | |
| Hayes, Kas. | 2,107 | 149 | 10 | 70 | | 96 | 15 | 156 | 226 | |
| Halleck, Nev. | 6,000 | 40 | 4 | 10 | | 41 | 3 | 73 | 83 | |
| Huachuca, Ariz. Ty | 5,173 | 197 | 61 | 314 | 4 enteric. | 182 | 22 | 120 | 434 | 1 enteric. |
| Indianapolis, Ind. | 698 | 27 | 13 | 483 | | 27 | 12 | 444 | 927 | |
| Jackson Barracks, La. | 10 | 77 | 39 | 506 | | 81 | 9 | 111 | 617 | |
| Jefferson Barracks, Mo. | 475 | 442 | 247 | 558 | 35 enteric, 12 typho-malarial | 557 | 351 | 608 | 1,166 | 6 enteric. |
| Keogh, Mont. Ty. | 2,536 | 420 | 15 | 36 | | 423 | 5 | 11 | 47 | |
| Klamath, Or. | 4,200 | 98 | 15 | 15 | 1 enteric. | 109 | 10 | 91 | 106 | |
| Laramie, Col. | 4,241 | 311 | 11 | 35 | | 260 | 6 | 33 | 68 | |
| Leavenworth, Kas. | 844 | 646 | 204 | 314 | | 594 | 123 | 207 | 521 | |
| Leavenworth Prison, Kas. | 844 | 106 | 7 | 65 | | 106 | 11 | 103 | 168 | |
| Lewis, Col. | 8,000 | 315 | 26 | 121 | | 361 | 42 | 116 | 237 | |
| Lowell, Ariz. Ty. | 2,530 | 196 | 48 | 244 | 10 enteric. Post Surgeon reports water contaminated by animal and vegetable matters, April, 1886. | 103 | 16 | 155 | 399 | 2 enteric. |
| Little Rock, Ark. | 290 | 106 | 43 | 406 | | 107 | 37 | 346 | 752 | |

| Posts. | 1885. | | | | | 1886. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Altitude. | Mean Strength of Command. | No. of Cases. | Ratio per 1,000. | Remarks. | Mean Strength of Command. | No. of Cases. | Ratio per 1000. | Sum of the Rate per 1000 for 2 Years. | Remarks. |
| Lyon, Col | 3,800 | 215 | 19 | 88 | | 164 | 39 | 237 | 325 | |
| McHenry, Md | 36 | 87 | 14 | 161 | | 109 | 17 | 155 | 316 | |
| McIntosh, Texas | 380 | 165 | 34 | 336 | | 140 | 21 | 150 | 486 | |
| McDowell, Ariz. Ty | 1,800 | 153 | 9 | 58 | | 83 | 6 | 72 | 140 | |
| Maginnis, Mont. Ty | 4,320 | 235 | 25 | 106 | | 232 | 18 | 77 | 183 | |
| Mackinac, Mich | 728 | 83 | 5 | 60 | | 80 | 0 | 0 | 60 | |
| McKinney, Wy. Ty | 5,175 | 290 | 24 | 83 | | 267 | 20 | 75 | 158 | |
| Marcy, N. M | 6,846 | 91 | 3 | 33 | | 71 | 2 | 28 | 61 | |
| Madison Barracks, N. Y | 262 | 227 | 4 | 16 | | 235 | 1 | 4 | 20 | |
| McDermitt, Nev. Ty | 4,700 | 40 | 0 | 0 | | 39 | 1 | 25 | 25 | |
| Mason, Cal | 85 | 44 | 3 | 68 | | 42 | 2 | 45 | 113 | |
| Missoula, Mont. Ty | 3,375 | 165 | 10 | 60 | | 171 | 1 | 5 | 65 | |
| Meade, Dak. Ty | 3,624 | 526 | 40 | 75 | | 519 | 16 | 30 | 105 | |
| Meyer, Va | 200 | 57 | 30 | 527 | | 56 | 37 | 600 | 1,187 | 1 enteri |
| Mojave, Ariz. Ty | 600 | 48 | 2 | 41 | | 45 | 0 | 0 | 41 | |
| Monroe, Va | 8 | 287 | 49 | 171 | | 253 | 44 | 174 | 345 | 4 enteri |
| Mt. Vernon Barracks, Ala | 155 | 80 | 32 | 400 | | 74 | 23 | 310 | 710 | |
| Niagara, N. Y | 271 | 76 | 5 | 65 | | 76 | 2 | 24 | 89 | |
| Newport Barracks, Ky | 588 | 45 | 3 | 66 | | 46 | 0 | 0 | 66 | |
| Niobrara, Neb | 2,750 | 250 | 6 | 24 | 2 enteric. | 206 | 5 | 24 | 48 | |
| Ontario, N. Y | 282 | 27 | 0 | 0 | | 41 | 1 | 24 | 24 | |
| Omaha, Neb | 960 | 388 | 15 | 35 | | 375 | 23 | 61 | 96 | 4 enteri |
| Preble, Maine | 38 | 45 | 2 | 44 | | 42 | 4 | 95 | 139 | |
| Pembina, Dak. Ty | 900 | 94 | 9 | 96 | | 85 | 4 | 46 | 142 | |
| Peña Colorado, Texas | 0 | 54 | 4 | 74 | 1 enteric. | 47 | 4 | 81 | 155 | |
| Plattsburg, N. Y | 186 | 72 | 1 | 14 | | 43 | 1 | 23 | 37 | |
| Poplar River, Mont. Ty | 2,030 | 91 | 0 | 0 | | 98 | 2 | 20 | 20 | |
| Porter, N. Y | 660 | 90 | 1 | 11 | | 84 | 2 | 23 | 34 | |
| Presidio, Cal | 85 | 315 | 17 | 54 | | 296 | 5 | 16 | 70 | |
| Randall, Dak. Ty | 1,245 | 159 | 2 | 12 | | 171 | 7 | 40 | 52 | |
| Rice, Texas | 0 | 63 | 4 | 63 | | 52 | 6 | 15 | 78 | |
| Riley, Kas | 1,300 | 251 | 63 | 251 | | 216 | 36 | 166 | 417 | 9 enteri |
| Rock Island, Ill | 528 | 59 | 21 | 365 | | 60 | 9 | 150 | 515 | |
| Reno, Indian Ty | 3,200 | 204 | 36 | 176 | | 258 | 106 | 410 | 586 | 1 enteri |
| Ringgold, Texas | 521 | 152 | 34 | 224 | | 184 | 45 | 244 | 468 | |
| Russell, D. A., Wy. Ty | 6,021 | 389 | 112 | 287 | 5 enteric. | 356 | 20 | 56 | 343 | |
| Robinson, Neb | 3,675 | 315 | 28 | 88 | 8 enteric. | 175 | 15 | 85 | 173 | |
| San Diego, Cal | 150 | 46 | 1 | 20 | | 45 | 3 | 76 | 96 | |
| San Carlos, Ariz. Ty | 0 | 121 | 12 | 96 | | 54 | 1 | 18 | 114 | |
| Selden, N. M | 4,250 | 48 | 2 | 40 | | 52 | 1 | 19 | 59 | |
| San Antonio, Texas | 673 | 308 | 52 | 169 | | 263 | 45 | 71 | 240 | |
| Sidney, Neb | 4,326 | 202 | 10 | 50 | | 198 | 3 | 15 | 65 | 1 enteri |
| Sill, Indian Ty | 1,200 | 262 | 253 | 969 | | 194 | 146 | 752 | 1,721 | |
| Shaw, Mont. Ty | 3,600 | 212 | 6 | 30 | | 207 | 9 | 43 | 73 | |
| Sully, Dak. Ty | 6,678 | 183 | 4 | 22 | | 188 | 3 | 16 | 38 | |
| Supply, Indian Ty | 2,300 | 253 | 60 | 237 | | 250 | 39 | 156 | 393 | |
| Sisseton, Dak. Ty | 2,000 | 96 | 10 | 10 | | 87 | 0 | 0 | 10 | |
| Snelling, Minn | 840 | 315 | 11 | 37 | | 295 | 5 | 17 | 54 | 1 enteri |
| Springfield, Mass | 100 | 34 | 0 | 0 | | 44 | 17 | 386 | 386 | |
| Schuyler, N. Y. Harbor | 25 | 71 | 7 | 99 | | 68 | 1 | 14 | 113 | |
| Stockton, Texas | 4,950 | 168 | 19 | 13 | | 132 | 14 | 106 | 109 | |
| Stanton, N. M | 7,500 | 186 | 66 | 348 | 1 enteric. | 204 | 8 | 39 | 387 | |
| Spokane, Wash. Ty | 1,600 | 219 | 8 | 37 | 1 enteric. | 195 | 1 | 5 | 42 | |
| St. Augustine, Fla | 15 | 94 | 13 | 138 | | 95 | 13 | 136 | 274 | 1 enteri |
| Thomas, Ariz. Ty | 2,710 | 172 | 42 | 244 | 8 enteric. | 129 | 28 | 217 | 461 | |
| Totten, Dak. Ty | 1,487 | 150 | 11 | 73 | | 178 | 1 | 5 | 78 | |
| Trumbull, Conn | 25 | 84 | 4 | 43 | | 78 | 1 | 13 | 56 | 1 enteri |
| Townsend, Wash. Ty | 135 | 93 | 5 | 54 | | 69 | 3 | 43 | 97 | |
| Uncompahgre, Col | 0 | 133 | 15 | 13 | | 83 | 2 | 24 | 37 | |
| Union, N. M | 6,700 | 230 | 24 | 104 | | 158 | 5 | 31 | 135 | |
| Vancouver, Wash. Ty | 50 | 449 | 50 | 111 | 12 dysentery. | 576 | 56 | 97 | 208 | 2 enteri |
| Verdi, Ariz. Ty | 3,160 | 97 | 8 | 82 | | 124 | 4 | 32 | 114 | |
| Wadsworth, N. Y. Harbor | 25 | 43 | 1 | 28 | | 44 | 7 | 159 | 187 | |
| Warren, Mass | 38 | 79 | 0 | 0 | | 81 | 0 | 0 | ... | 1 enteri |
| Washington Barracks, D. C | 90 | 183 | 45 | 246 | | 260 | 39 | 150 | 396 | 2 enteri |
| Walla-Walla, Wash. Ty | 865 | 283 | 37 | 131 | 6 enteric. | 288 | 33 | 114 | 245 | 8 enteri |
| Winfield Scott, Cal | 85 | 105 | 1 | 10 | | 101 | 0 | 0 | 10 | |
| Wayne, M | 580 | 186 | 29 | 156 | 8 enteric. | 173 | 20 | 115 | 271 | 2 enteri |
| West Point, N. Y | 167 | 326 | 42 | 126 | | 327 | 39 | 119 | 245 | 1 enteri |
| Willetts Point, N. Y | 25 | 199 | 29 | 146 | | 394 | 67 | 184 | 330 | |
| Wingate, N. M | 6,649 | 353 | 17 | 48 | | 310 | 28 | 90 | 138 | |
| Whipple Barracks, Ariz. Ty | 5,340 | 159 | 23 | 144 | | 132 | 10 | 75 | 219 | |
| Watervliet Arsenal, Mass. | 50 | 33 | 5 | 151 | | 35 | 4 | 14 | 165 | |
| Washakie, Wy. Ty | 5,462 | 109 | 18 | 165 | | 112 | 0 | 0 | 165 | 2 enteri |
| Yates, Dak. Ty | 0 | 287 | 4 | 31 | 2 enteric. | 248 | 11 | 44 | 75 | |

# ON THE BEST RATION FOR THE SOLDIER.

## DE LA MEILLEURE RATION POUR LE SOLDAT

## ÜBER DIE BESTE RATION DES SOLDATEN.

BY JOSEPH R. SMITH, A. M., M. D.,

Brevet-Colonel, Lieut.-Colonel and Surgeon U. S. Army.

Fuel in relation to the steam engine, and food in relation to man are largely analogous. The least amount of fuel burned in the engine, and the largest amount of mechanical work produced therefrom, are capable of exact measurement, and the experiment of determining these is not difficult to perform. But the smallest amount of food in a man, necessary to produce the best results in work, is scarcely capable of such exact determination, owing to the complexity of the experiments needed to determine the question.

Experiments have been tried in this direction with surprising diversity of results, and the personal equations of different observers have only added their effects to the imperfections of ultimate analysis.

To these difficulties in the way of absolutely accurate experimental results, must be added others less easy to surmount, because inherent in the subjects of the experiment—*i. e.*, food the fuel, and man the machine.

Different specimens of the same kind of food vary in their chemical composition and nutritive value. Bacon varies in the amount of water contained in equal weights, as well as in the relative proportion of fat, etc. Different specimens of flour vary in the proportion of every one of its constituents. In the analysis of flour by Peligot, the proportions of fat present so differed, that in one specimen it very nearly doubled that in another.

The ultimate composition of the *proximate* principles equally varies, so that different specimens of the same fat are far from yielding the same amount of carbon.

Then, even were the exact value of the food determined, different individuals do not daily require the same amount of food, and the same individual on different days, —owing to causes well known to you and too numerous to mention here,—requires different amounts of food.

If it is attempted to measure the need of food by the appetite, it is early apparent that one is not the measure of the other, and that their relations are uncertain. The glutton eats for the love of eating, and one person will starve on what amply nourishes another.

The *weight* of the body is equally worthless as a standard by which to measure the amount of food needed. In daily observations, persons of small weight will often be greater eaters than persons of great weight. Under directions of the writer, observations were made for six months on a mess of thirteen adult males of greatly differing weights. At the close of the experiment, the author found it impossible to discover any dependence of the amount of food eaten on the weight of the body.

So, too, the *composition* of the human body gives no clue to the amounts or proportions needed of the different kinds of food. The average body contains, by weight, not far from 18 per cent. of proteine compounds, about 15 or 16 per cent. of fat, and but seven-tenths of 1 per cent. of carbo-hydrates. Yet, experience has proven that our daily food must contain several times as much of the carbo-hydrates as of fat and proteines combined.

It has been attempted to use the *work* done by the body as a measure of the food needed. The difficulty of determining with accuracy the work done by and in the

body seems impossible. Take the simplest case, where the work to be measured is the movement of the body in walking for a day. A day's march cannot be made exactly in the shortest, straightest line from place to place; nor in an ordinary march is it possible to tell the exact distance covered. The soldier will always vary from the line—will always make excursions of one kind or other—to the well, the bar-room, or a seat in the shade of a tree. If these variations and excursions only amount to half a mile in the day's march,—if the walker weighs 150 pounds, and his accoutrements, etc., 60 pounds, and the coëfficient of traction be one-twentieth the weight,—we have the equations $\left(\frac{150+60}{20}\right) \times 2640 = 42{,}240$ representing the uncertain element —the foot pounds—of work done, in going the extra half mile.

A difference, not very great, in the weight carried, makes also considerable difference in the work done, and this difference may occur in such a way as to defy the forethought of the experimenter. In a hot, sultry day, a man may, without great difficulty, lose 3 pounds weight, by the skin, in the first hour of his march. In a 20-mile march the difference in foot pounds of work done, between carrying the weight of his body 20 miles, and the carrying of the full weight 2 miles, plus the weight less 3 pounds for 18 miles of the 20, would equal 14,256 foot pounds of labor not calculated on beforehand.

To this add the indefiniteness of our knowledge of the exact amount of work performed in mental operations, in the movement of the heart and intestines and other internal actions in the body. From investigations, principally by Donders, it appears that at each heart-beat of the average man, an amount of work is done equal to that which would lift 4.63 pounds 1 foot, while a respiratory act equals in work 4.56 foot pounds. So a heart beating 80 times a minute for 24 hours would do work equal to 533,376 foot pounds. A consideration of these investigations show how difficult, nay, impossible it is to avoid a slight error, and yet an error of only the one-hundredth of a pound, thus multiplied, would equal 1152 foot pounds in 24 hours, an amount of work representing considerable food. Is it not clear, that any estimate of food needed, based on this work done must be lacking in precision?

The *amount* of food needed cannot be deduced from those effects of eating that are quickly apparent and easily appreciated.

The effects of the entire absence of food are prompt and easily recognized. Not so the effects of an allowance of food *slightly* insufficient. Both under-feeding and over-feeding, in *slight* degree, may continue for long periods of time, and produce effects difficult, if not impossible, to trace to their cause.

It has been sought to ascertain the amount of food required, from the excreta. Putting aside the difficulties of merely collecting and accurately measuring the excreta of the lungs, skin, etc., yet, when determined exactly, the excreta are not logically the measure of the food *needed*, but rather of the food that has been taken into the body, whether more or less than the amount actually needed. All the food that enters and passes through the body is not assimilated, nor does it all serve as nourishment.

*Rigorously exact* experiments in feeding large bodies of men have never been made, and in the experiments in our hands, namely, the feeding of armies and reformatory institutions, the principal errors are, that the *exact* amount of food issued as rations is not known; that the *precise* number of persons eating is not known; that food is procured from external sources other than the rations; and that large waste and surplus exists; the food is unaccounted for.

Considering the foregoing elements of uncertainty entering into the solution of the problem, notwithstanding the numerous "tables of quantity of food needed daily by a man," published all over the world, apparently precise to a grain, I submit that we do not yet know what is the exact or smallest amount of food needed to sustain a healthy man in his good health, in all the differing circumstances of rest and work.

If, then, without precise accurate knowledge on the subject, what approximate knowledge do we possess, that we may act on in trying to supply an army with the food the best for it?

By general experience and individual experiment we have discovered *a certain amount of food* which *will* sustain an average individual in good health; and, also, *that much less than this* will *not* suffice, though we do not know that a *little less would not* suffice. We have discovered, too, that certain combinations and proportions of different foods are best in the larger number of cases.

As large numbers of men are involved in these experiments, the application of "averages" comes to our aid, viz.: that property of the "average" in virtue of which, from a large number of specific cases, every one inaccurate in different directions, an idea may be deduced which is very near, indeed, to accuracy.

I proceed to give the amounts of food necessary to sustain in health and strength an adult male for twenty-four hours, as determined theoretically and (by experience) practically by different parties.

## TABLE I.

### Amount of Food required per Man, per Day, as Determined in Actual Trial.

| | | | Average. | Total Solid Food. | |
|---|---|---|---|---|---|
| 1 | By Prof. J. C. Dalton. | Fresh meat<br>Bread<br>Butter or fat | 16 ozs.<br>19 "<br>3.5 " | 38.5 ozs. | For a "man in full health and taking free exercise in the open air." |
| 2 | Typical Ration of English Army. | Meat<br>Bread<br>Or biscuit<br>Vegetables, fresh<br>Or vegetables, preserved, Or rice or peas,<br>Sugar<br>Tea<br>Coffee<br>Salt<br>Pepper<br>Lime juice, {when fresh vegetables are not issued.}<br>Rum | 16 ozs.<br>20 "<br>16 "<br>8 "<br>2 "<br>2 "<br>½ "<br>½ "<br>½ "<br>1/16 "<br>1 "<br>½ gill. | Max. 46 ozs. to Min. 36 " | Lime juice at discretion of the General Officer commanding, on the recommendation of the Medical Officer. |
| 3 | Italian Army. Type B. | Bread<br>Meat, fresh<br>Bacon<br>Pastry (macaroni, etc.)<br>Vegetables<br>Salt and pepper | 32.378 ozs.<br>5.291 "<br>.529 "<br>7.064 "<br>1.763 "<br>.7054 " | 47.013 ozs. | In Nos. 3 and 4, wine, 25 centilitres; coffee, 15 grammes (over ½ oz.), and sugar, 22 grammes (over ¾ oz.), should be added, being allowed. |
| 4 | Italian Army. Type E. | Corn meal<br>Meat, fresh<br>Bacon<br>Vegetables<br>Cheese<br>Salt and pepper | 24.689 ozs.<br>5.291 "<br>.529 "<br>2.645 "<br>1.164 "<br>1.411 " | 34.318 ozs. | |
| 5 | Ration of the Army of the United States of North America. | Pork or bacon<br>Or fresh beef or mutton<br>Or salt beef<br>Soft bread or flour<br>Or hard bread<br>Or corn meal<br>Beans or peas<br>Or rice or hominy<br>Coffee, green<br>Or coffee, roasted and ground<br>Or tea<br>Sugar<br>Vinegar<br>Salt<br>Pepper | 12 ozs.<br>20 "<br>22 "<br>18 "<br>16 "<br>20 "<br>2.4 "<br>1.6 "<br>1.6 "<br>1.28 "<br>.32 "<br>2.4 "<br>.32 gill.<br>.64 oz.<br>.04 " | Max. 46.8 ozs. to Min. 32 " | |

| | | | Average. | Total Solid Food. |
|---|---|---|---|---|
| 6 | Rations of the Navy of the United States of North America. | No. 1. | Salt pork 16 ozs.<br>Beans or peas 7.5 "<br>Biscuit 14 "<br>Tea ½ "<br>Sugar 4 "<br>Pickles 1.14 "<br>Molasses 1.57 "<br>Vinegar ½ pint. | Max. 48 ozs to Min. 38 " |
| | | No. 2. | Salt beef 16 ozs.<br>Flour 8 "<br>Dried fruit 2 "<br>Biscuit, tea, sugar, pickles, molasses and vinegar, the same as in Ration 1. | |
| | | No. 3. | Preserved meat 12 "<br>Rice 8 "<br>Butter 2 "<br>Desiccated mixed vegetables 1 "<br>Biscuit, tea, sugar, pickles, molasses and vinegar, as in Ration 1. | |
| | | No. 4. | Preserved meat 12 "<br>Butter 2 "<br>Desiccated tomatoes 6 "<br>Butter, tea, sugar, pickles, molasses and vinegar, as in Ration 1. | |
| | | | In the above rations, *fresh meat*, ozs. 20, or *preserved meat*, ozs. 12, may be substituted for the ration of salt pork or beef.<br>*Soft bread*, or *flour*, ozs. 16, may be substituted for *biscuit*.<br>*Coffee*, ozs. 2, or *cocoa*, ozs. 2, may be substituted for tea. *Rice* or *beans*, ozs. 8, may be substituted for each other. *Vegetables* of *equal value*, may be substituted for beans or peas in No. 1, and for flour and dried fruits in No. 2.<br>*Canned vegetables*, ozs. 6, may be substituted for desiccated vegetables in No. 3.<br>*Canned tomatoes*, ozs. 6, may be substituted for *desiccated* in No. 4. | |

The foregoing amounts of food are in avoirdupois ounces, and have undergone the test of experience.

Concerning the 1st, Dalton, in his work on Physiology, says: "From experiments performed while living on an exclusive diet of bread, fresh meat and butter, with coffee and water for drink, we have found that the entire quantity of food required during 24 hours, by a man in full health and taking free exercise in the open air is as follows: Meat, 16 ozs.; bread, 19 ozs.; butter or fat, 3½ ozs.; water, 52 fluid ozs."

The 2d, 3d and 4th rations are those of the British and Italian armies. I have given these, because, my knowledge concerning them is precise and definite. The amounts of food are authoritative, the figures having been furnished by the authorities in Rome and London to the United States Ministers resident in those cities, and by them transmitted to the State Department in Washington.

Accompanying No. 2, came the following: "On active service abroad, in the field, the ration is fixed according to the exigencies in each case, but the following scale is laid down as a guide:".

The Italian authorities write, concerning 3 and 4, "it is established that for the maximum nutrition of soldiers, from eighteen to twenty grammes of (azote) nitrogen, and from three hundred and ten, to three hundred and fifty of carbon are necessary." Six types of rations used were also sent, of which I have presented type B as of the greatest weight, and type E of the least weight.

The additional remark accompanies these rations: "Of wine, 25 centilitres; of coffee, 15 grammes; of sugar, 22 grammes only are allowed for each day. The distribu-

tion of these things is not made daily, but the regulation determined ad minimum—100, distribution of coffee and wine per annum."

No. 5 is the ration of the U. S. Army, and No. 6 gives the four rations allowed in the U. S. Navy.

## TABLE II.

### CONSTITUENTS OF VARIOUS DIETS.

| | | Albuminates. | Fatty. | Carbo-hydrates. | Salts. | Nitrogen. | | Carbon. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ozs. | ozs. | ozs. | ozs. | gm. | grs. | gm. | grs. | |
| | Moleschott | 4.587 | 2.964 | 14.247 | 1.058 | 21 | 317 | 315 | 4,860 | In ordinary work. |
| 2 | Pettenkoffer and Voit | 4.83 | 4.12 | 12.40 | 1.06 | 22 | 333 | 321 | 4,957 | In ordinary work. |
| 3 | Ranke | 3.52 | 3.52 | 8.46 | .89 | 16 | 243 | 238 | 3,680 | In ordinary work. |
| 4 | Parkes | 6 to | 3.5 to | 16 to | 1.2 to | 27 to | 414 to | 370 to | 5,715 to | For an adult man in very laborious work, or a soldier no service and in the field. |
| 5 | Parkes | 7 | 4.5 | 18 | 1.5 | 31 | 483 | 433 | 6,682 | |
| 6 | Playfair | 2.5 | 1 | 12 | | 11 | 172 | 211 | 3,257 | Diet in quietude. |
| 7 | Playfair | 4.2 | 1.8 | 18.7 | | 19 | 290 | 339 | 5,232 | Diet of adult in full health. |
| 8 | Playfair | 5.5 | 2.5 | 20 | | 25 | 379 | 391 | 6,029 | Diet of active laborers. |
| 9 | Playfair | 6.5 | 2.5 | 20 | | 29 | 448 | 406 | 6,262 | Diet of hard-worked laborers. |
| 10 | No. one of preceding table | 6.041 | 5.942 | 9.348 | .8135 | 27 | 417 | 342 | 5,276 | Dalton's experiment. |
| 11 | No. two of preceding table | 3.736 | 1.4398 | 12.7084 | .5545 | 17 | 258 | 249 | 3,836 | Ration of English Army. |
| 12 | No. three of preceding table | 3.9622 | 1.2689 | 21.5543 | .5788 | 18 | 273 | 360 | 5,548 | Ration of Italian Army, type B. |
| 13 | No. four of preceding table | 3 8833 | 3.0474 | 16.3812 | .592 | 17 | 268 | 333 | 5,139 | Ration of Italian Army, type E. |
| 14 | No. five of preceding table | 5.238 | 3.0624 | 13.608 | .6952 | 23 | 361 | 319 | 5,504 | Ration of United States Army. |
| 15 | No. five of preceding table | 5.708 | 1.0608 | 15.3912 | 3.028 | 26 | 394 | 304 | 4,686 | Ration of United States Army. |
| 16 | No. six of preceding table | 5.90 | 1.8644 | 20.094 | .7426 | 26 | 407 | 383 | 5,912 | Ration of United States Navy. |
| 17 | No. six of preceding table | 6.76 | 1.366 | 21.703 | 3.951 | 30 | 466 | 406 | 6,262 | Ration of United States Navy. |
| | | | ozs. | | | | | | | |
| 18 | Letheby, as determined by dietaries | 2.67 | 16.53 | | | 12 | 180 | 247 | 3,816 | Diet during idleness. |
| 19 | Letheby, as determined by excretions | 2.78 | 18.47 | | | 12 | 187 | 269 | 4,157 | Diet during idleness. |
| 20 | Letheby, as determined by dietaries | 4.56 | 24.48 | | | 20 | 307 | 369 | 5,688 | Diet during routine work. |
| 21 | Letheby, as determined by excretions | 4 39 | 19.80 | | | 19 | 296 | 307 | 4,743 | Diet during routine work. |
| 22 | Letheby | | | | | 12 | 181 | 252 | 3,888 | Diet for existence without suffering. |
| 23 | Letheby | 2.97 | 20 | | | 13 | 200 | 279 | 4,300 | "What daily food should contain." |

The amount of the food principles in Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 18, 19, 20, 21 and 23, and of N and C, in 22 and 23, are as given by the authors; but in the other cases these amounts have been calculated by the figures given in the Tables of Parkes or Letheby.

As regards the beef. seventeen per cent. has been deducted for bone. The proportion of bone in an issue of beef is not identical with the proportion of bone to the animal, because certain portions are excluded from issue. A few years ago, to determine the proportion of bone, I weighed the beef and bone in a number of experiments. The weight of the beef issued was 1813 lbs. 4 oz., embraced in 65 separate issues, and

the amount of bone was 309 lbs. 3 ozs., that is 17 per cent. In the analysis of Dr. Dalton's ration, however, this deduction was not made, as I am informed by Prof. Dalton, under date of August 6th, 1887, that the meat referred to in his experiment was "free from bone," and freed as much as possible from all inedible parts.

Molasses is estimated to contain two-thirds the hydro-carbon of sugar.

For reasons well known to you, only C and N are embraced in the results of the ultimate analysis.

The foregoing figures show a great range in the absolute and relative amounts of nitrogenous and carbonaceous food so-called; of C and N; and of the food in the gross, and this without considering acknowledged excessive or deficient diet, for we are not here interested in determining how near a man may come to starving and still survive.

The form in which this food is ingested is not a matter of indifference. A certain bulk is necessary. Long-continued nutrition by food in a very concentrated form, is invariably accompanied by many evils, among which are intestinal discomfort, constipation and dyspepsia with its sequels. Jockeys also know that a horse will not thrive on oats or corn alone; he must also have hay in considerable quantity.

In Dalton's experiment, 38.5 ozs. were eaten daily (Table I, No. 1).

The Typical Ration of the English Army (No. 2, Table I) contains a maximum of 46, and a minimum of 36 ozs.

The U. S. Army ration (No. 5, same table), ranges from 46.8 to 32 ozs. One of its combinations (No. 14, Table II) contains—

| | | |
|---|---|---|
| Fresh beef | 20 | oz. |
| Corn meal | 20 | " |
| Peas | 2.4 | " |
| Sugar | 2.4 | " |
| | 44.8 | " |

(Coffee, vinegar, salt and pepper, though part of the ration, are not included in this estimate of solid food.)

Another combination (No. 15, Table II) contains—

| | | |
|---|---|---|
| Salt pork | 12 | oz. |
| Hard bread | 16 | " |
| Rice | 1.6 | " |
| Sugar | 2.4 | " |
| | 32 | " |

The Italian Army ration varies between 1336 grammes = 47.12 ozs. and 973 grammes = 34.32 ozs. One of its combinations, No. 12, Table II, contains—

| | | | | |
|---|---|---|---|---|
| Meat | 150 | grammes | = | 5.291 oz. |
| Bread | 918 | " | = | 32.378 " |
| Bacon | 15 | " | = | 0.529 " |
| Pasta (macaroni, etc.) | 200 | " | = | 7.054 " |
| Vegetables | 50 | " | = | 1.763 " |
| | 1333 | " | = | 47.015 " |

No. 13, Table II, contains—

| | | | | |
|---|---|---|---|---|
| Meat | 150 | grammes | = | 5.291 oz. |
| Corn meal | 700 | " | = | 24.689 " |
| Bacon | 15 | " | = | 0.529 " |
| Vegetables | 75 | " | = | 2.645 " |
| Cheese | 33 | " | = | 1.164 " |
| | 973 | " | = | 34.32 " |

This excludes salt and pepper, also sugar, of whose issue every day I am doubtful. If this be added, the amount of sugar allowed is 22 grammes = 0.776 oz.

The ration of the U. S. Navy (No. 6, Table I), ranges between 48 and 38 ozs. One of its combinations (No. 16, Table II) is composed of—

| | | |
|---|---|---|
| Fresh beef | 20 | oz. |
| Flour | 16 | " |
| Peas | 7.5 | " |
| Sugar | 4 | " |
| | 47.5 | " |

Another combination; No. 17, Table II, contains—

| | | |
|---|---|---|
| Salt pork | 16 | oz. |
| Biscuit | 14 | " |
| Rice | 8 | " |
| Sugar | 4 | " |
| | 42 | " |

with both these last rations, molasses, coffee and pickles are issued.

It does not seem necessary to try and fix more accurately the proper bulk of a Ration, for we may take it for granted that this matter will be regulated by the mere fact that, in foods in general in their crude state, the proportion of bulk to the proximate constituents demanded in a great ration is sufficiently proper, and may largely vary without injury to the consumer.

In the next place, experience has proved that in a satisfactory diet there must exist in the food taken, water, salts, nitrogenous food as proteines, and carbonaceous food as fats and carbo-hydrates. These last two are to a large extent complementary and interchangeable, and of all of them, the carbo-hydrates can best be spared.

The proportion of nitrogenous and carbonaceous food, and the proportion of pure N and C in a given diet are not identical, inasmuch as the nitrogenous foods contain also C. But though the lines representing these proportions in a series of diets would not exactly coalesce, yet they are nearly parallel.

In the 22 rations in Table II, the mean proportion of the nitrogenous to the carbonaceous food is 1.000 to 4.023, the extremes being 1.000 to 2.531 in No. 10, by Dalton —and 1.000 to 6.734 in No. 23, by Letheby.

The carbo-hydrates exceeded the fats, on an average, in the proportion of nearly 6 to 1 (5.953 to 1.000). In No. 12, one of the Italian rations, this proportion was 17 to 1; and in No. 10 (Dalton's) 1.59 to 1.00.

The proportion of N to C for the 23 rations in Table II averages 1 to 15.9; the extremes being 1 to 11.89 in No. 15, a ration of the U. S. Army, and 1 to 22.2 in No. 19, or Letheby's diet during idleness.

The average amount of N and C contained in the 23 rations of Table II was 316 grs. and 5019 grs., respectively. The maximum nitrogen is formed in No. 5, one of Parkes' rations, and is 483 grs. The maximum carbon, 6682 grs., is found in the same, No. 5.

The minimum of N, 172 grs., appears in No. 6, Playfair's diet of quietude; the minimum of C, 3257 grs., is in the same number 6.

Here it will be well to give the statement of Liebig, in his Animal Chemistry, in its application to physiology and pathology, that an adult taking moderate exercise consumes daily of C 13.9 ozs. This equals about 6700 grs.

Pavy also assumes in his treatise on food, etc., page 424, that 300 grs of N and 4800 grs. C are daily required.

To aid us in our object of obtaining, as near as may be, exact figures of the amount of food needed daily by the soldier, it is manifest that the figures in Table II are not all of equal value.

*The smallest amount that for a long period of time has well supported life is clearly sufficient*, and the fact that larger quantities have also supported life, in no manner conflicts with the first conclusion, it does not prove that less would not have sufficed. Experience and experiments intelligently prosecuted with intent of determining the point at issue, must have their value; even what they did *not* prove is significant.

Bearing this in mind, let us attempt a short analysis of Table II.

1, 2 and 3 are deduced from careful experiments, none of which were carried out for a sufficiently long time to make them decisive for our purpose here. Granting that they give amounts that will support life and health in ordinary work, these are not proved to be minima; nevertheless, they are for our purpose among the most reliable experiments extant. They are near the point.

4 and 5 are from Parkes, in his own language, "determined partly by observation on a great number of dietaries, and partly by physiological experiments." They give the amount of food that will support "a man in very laborious work" and doubtless, for the author would not err on the wrong side, a surplus; for our purpose here they are valuable, as showing a limit, *under which we must seek.*

6, 7, 8 and 9 are from Playfair's lecture on "The Food of Man," page 19. No. 6 gives merely the "diet for quietude," and, therefore, for our purpose provides a minimum *above which we must seek.*

7 is the mean dietetic value of the dietaries of the English, French, Prussian and Austrian soldiers during peace. (p. 11, op. cit.) Concerning it, Playfair says "it may fairly be taken as representing the value of food required to keep adult men in good health."

8 is evidently formed from the dietaries of English, French, Prussian, Austrian, Russian, Hollander and United States soldiers during war, but in amount exceeds their mean. (p. 14, op. cit.) Concerning 7, 8, and 9, the same remark applies as to 4 and 5; they give a *maximum, below which we must seek.*

10 gives the amount of food required in 24 hours by a man in health, taking free exercise. It too, evidently, gives us a maximum.

11, the ration of the English soldier, comes to me from authoritative sources, though differing from that given by Parkes in the third edition of his Hygiene. I cannot tell the exact amount of experience it has been tested by, but it is fair to presume that, unless so proved, it would not have been sent us. It doubtless voices the views of the English military authorities. For our purposes, therefore, it represents a ration, from its origin entitled to be considered very near the exact limit of sufficiency.

12 and 13, like 11, are from State dispatches, nor can I tell the tests they have been put to. They were avowedly constructed to conform to a theoretical view, and forced to contain (vide p. 8) a maximum. For our purposes, they must be regarded as showing an amount of food below which we must seek.

14 and 15 represent the heaviest and lightest combinations of the constituents of the ration of the soldier of the United States Army. 14 contains—

| Articles. | Oz. | Albuminate. | Fat. | Carb.-Hydrat. | Salts. | | |
|---|---|---|---|---|---|---|---|
| Fresh beef | 20 | = ℥ 2.49 | ℥ 1.3944 | | ℥ 0.2656 | | |
| Corn meal | 20 | = " 2.22 | " 1.62 | ℥ 13.02 | 0.3600 | | |
| Peas | 2.4 | = " 0.528 | " 0.048 | 1.272 | 0.576 | | |
| Sugar* | 2.4 | = | | 2.316 | 0.012 | N | C |
| | 44.8 | = 5.238 | 3.0624 | 16.608 | 0.6952 | = gr. 361 | gr. 5504 |

* Coffee, tea, salt, pepper and vinegar not included in calculation, though issued.

15 contains—

| Articles. | Oz. | | Albuminate. | Fat. | Carb.-Hydrat. | Salts. | | |
|---|---|---|---|---|---|---|---|---|
| Salt Pork | 12 | = | ʒ 3.132 | ʒ 0.84 | | ʒ 2.736 | | |
| Hard Bread | 16 | = | " 2.496 | " 0.208 | ʒ 11.744 | 0.272 | | |
| Rice | 1.6 | = | " .08 | " 0.0128 | 1.3312 | 0.008 | | |
| Sugar* | 2.4 | = | " | | 2.316 | 0.012 | N | C |
| | 32 | = | 5.708 | 1.0608 | 15.3912 | 3.028 | = gr. 394. | gr. 4686 |

In practice, as fresh beef is cheaper than salt meat, the ration of peace is habitually No. 14, with the substitution of 18 ozs. flour for 20 ozs. corn meal. This substitution reduces the value of the ration by N 17 grs. and C 562 grs.

During campaigns, in consequence of the cheapness of live stock, and the ease with which it can be driven on the hoof, 20 ozs. fresh beef is frequently substituted for 12 ozs. pork. This substitution reduces the ration by N 44 grs., and increases it by C 42 grs.

For many years I have investigated the sufficiency of these rations in actual use in the army. A report of certain of these investigations, giving facts and conclusions therefrom, was made by me to the military authorities in 1880, and published in the Annual Report of the Commissary General of Subsistence to the Secretary of War in 1881.

These investigations covered nearly 17 months, and included all rations issued in that period to an average of 3824 soldiers.

It must be understood, that in the United States Army, company commanders can legally sell portions of the soldiers' ration, and with the proceeds, at their discretion, buy whatever they choose for the use of the soldier.

My report then showed, that from the food of the soldier was arbitrarily taken, for what is called the "Post fund," and used to support regimental bands, libraries, etc , a sum equal to about one cent per man per day.

Besides this, another portion of the ration was sold by the company commander, and the proceeds expended for articles other than food, to the amount of more than one-fifth of a cent per man per day. So that the soldier lost from his legal allowance an amount of nearly one and one-sixth cent daily (1.1627 cent).

During the time specified, flour was worth $38.69 per thousand, and beef $5.35 per hundred, so that the soldier was deprived of so much of his food as would have bought him daily 4.8 ozs. of flour or 3.47 ozs. of beef. Habitually, he received 18 ozs. of bread instead of 18 ozs. flour, equalling, in deprivation to the soldier, N 37 grs. and C 894 grs.

In war or campaign, this process of sale and barter was somewhat interfered with.

The rations of the U. S. Army, in point of fact, even thus diminished, have nourished well the armies of the United States for many years—both volunteers and regulars. Indeed, less has sufficed; for since the great Civil War, 1861–5, the ration of salt, tea, and salt beef have been increased.

Very rarely has complaint of insufficiency been heard at all, and still more rarely from the consumers themselves—the soldiers; complaints more generally were from the company officers, who, nevertheless, cast doubt and distrust upon the sincerity and justice of their complaints, by continually taking, as above stated, from the starving soldier, a part of the food already represented to be too small.

In view of all the foregoing, there can be no doubt that the ration under consideration is more than ample in time of peace, and at least sufficient in time of war.

Concerning 11, 14 and 15, although presenting maxima, yet considering the general

* Coffee, tea, salt, pepper and vinegar not included in calculation, though issued.

indisposition of governments to yield to sentiment and uselessly make an allowance in greater amount than absolutely needed by its dependents, we may consider them as approximating to the amount we are seeking for.

16 and 17 give the heaviest and the lightest combinations from the ration of the United States Navy.

All the Navy rations (vide Table I) are constructed with salt meat or preserved meat as staples. Fresh meat is secondary.

In absolute quantity allowed, they are among the very largest of our series, and must be considered as maxima.

18, 19, 20, 21, 22, and 23 are from Letheby. For our purpose, 18, 19, and 22, from their terms, are to be considered as minima, above which we must search.

20 and 21 are maxima.

23, I am compelled to exclude in its published form. 2.97 ozs. of nitrogenous food and 20 ozs. of carbonaceous food, the amounts given by Letheby (p. 123), reduced by Parkes' tables, as applied to the other rations, give about 5000 grs. C, instead of 4300. I regret the more to be compelled so to do, because the knowledge and discretion of its author entitle his views to great consideration, and because concerning it he uses the language, "a man's daily food should contain *not less than* C, 4300 grs., N, 200 grs., represented by 20 ozs. carbonaceous food and 2.97 nitrogenous."

And here occurs the question to what class does the soldier assimilate as regards diet? Playfair (p. 19, op. cit.), treats of 5 diets, as follows: 1. Subsistence diet. 2. Diet in quietude. 3. Diet of adult in full health. 4. Diet of active laborers. 5. Diet of hard-worked laborers.

The meaning of the 1st and 2d is self-explained. The 3d, I have given as No. 7 in Table II. Almost identical with the mean of the dietaries of soldiers in time of peace, he thus puts soldiers in peace, and adults in full health in the same class, as regards need of food.

The 4th class is of active laborers. On page 15 (op. cit.) he gives the mean of war diet, calculated on the food of English soldiers in the Crimean and Kaffir wars, French in the Crimean war, Prussian in the Schleswig war, Austrian in the Italian war, Russians in the Crimean war, Hollanders in the Belgian war, and Federal and Confederate soldiers of the United States during the Civil war. On comparing the mean diet of these soldiers with that of his 4th class—active laborers—I find that the amounts for the latter are greater than for the soldiers in war, in every alimentary principle, viz., flesh formers, fat, starch, starch equivalent, and carbon. Evidently Playfair concluded that "active laborers" need more nourishment than soldiers in war. In this conclusion I concur. The life of a soldier in war has days, now and then, characterized by severe and protracted exertion. So also has the life of most others. The habitual constant life of the soldier, even in war, is far from being one of excessive violent labor, and on the other hand, in peace it is not one of rest. Roll calls, fatigue duty, inspections, drills, and parades, necessitate exertion in the line of duty, and but very few soldiers fail to walk, jump, run or someway skylark in the line of pleasure. So it would appear that the exertions of war, of the bivouac and march and battle, are not *entirely* additional, extra work; but that certainly a part merely takes the place of other work, of a different kind, formerly done.

Nothing is more certain than that hard workers *need* more food than the idle.

Bodily work can only be effected by the waste of muscle, whose regeneration is necessary for further work, and for whose regeneration nitrogenous food is absolutely needed, food in the shape of proteines must be supplied, and the supply augmented with the increase of work, and in the human body there is more muscular tissue than of all the other tissues combined.

It has been shown, too, that fatty food possesses enormous force-producing value,

compared with other food principles, and so the supply of fat may be advantageously increased where bodily work is increased.

But in taking the amount of food *used* by non-workers as a datum on which to calculate the amount *needed* by workers, we must not forget that in reality the idle, those who do not *need* much food, *consume* precisely as much as the worker who needs much food.

So it has seemed to me that theorizers have erred in this direction; a tendency to prescribe for increased works a greater increase of food than it is entitled to, over the amount consumed by small workers.

Did we discover an unanimity of opinion regarding the amount and kind of food needed by the soldier; did we find that the reasoning of different students and the experiments of different observers conducted to one and the same exact result, in regard to the kind and quantity of food required, then nothing but such qualities of food should be allowed to enter into our determination of the question.

But this is not so, and hence, other elements must be considered. These are principally personal preferences, cost, and facility of transportation. For some reason or other the French soldier desires his potâge, the Italian his macaroni, the Hindu and Chinese his rice, and the English and American his meat and bread and butter. When the nutritive properties of different foods are equal, these preferences must be respected, and even when they are not, for a man's taste will often influence supremely his digestive powers. It happens too, sometimes, perhaps in consequence thereof, that the articles preferred in a given country are the cheapest and easiest to obtain.

Certain forms of food are most easily carried. In the United States live stock is easily driven on the hoof. Hard-bread can be compactly packed in boxes; salt pork or bacon in barrels, and conveniently thus carried, and these facts have much to do with the selection of the diet of the U. S. soldier. Cheapness, too, will vary in different years and places.

So it follows that the absolute and relative amounts of N and C, the absolute and relative proportions of nitrogenous and carbonaceous food, and the bulk of the ration in its natural state, which is provided for different armies, must vary; and all these differences and variations in food proportions be consistent with perfect nutrition.

This is largely due to the fact that the food ingested, enters the great laboratory of the interior of the body, and there is subjected more or less to that mysterious entity termed the vital power, which, certainly in part, co-ordinates and controls the constructive and destructive processes, viz.: the decomposition of the food, its assimilation and the building up of the body, dis-assimilation, secretion and excretion. The human body possesses an elective power, enabling it from the foods ingested to select out and use those elements, and those only, that it needs, discarding others that may be just as good but are not at that time needed.

Experience has proved that no article of food, save the mother's milk in childhood, presents in suitable proportions all the alimentary principles needed, and to obtain sufficient of an element needed for one system or function, it is necessary to take in more of other elements than are needed, though this necessity is somewhat fulfilled by eating mixed foods.

But to return to our analysis of Table II. We have found of the twenty-three diets there given, that the majority are not what we seek, viz.: a diet that is sufficient and as near the minimum as may be.

Four of these, one by Playfair and three by Letheby, are, by their terms, minima; the largest contains N, 187 grs., and C, 4157 grs., so that we must decide on more than this.

Twelve of these, two by Parkes, three by Playfair, one by Dalton, two of the Italian Army, two of the U. S. Navy, and two by Letheby, we are justified in considering as

maxima; doubtless enough, and also more than enough. The smallest of these, contains N, 268 grs. and C, 5139 grs., so that we may expect to find a less amount than this a sufficiency.

One (Letheby's), as such, was excluded in consequence of discrepancy in its figures, but I retain it, analyzed by the tables (Parkes) by which the other diets were resolved, and taking the carbonaceous food, twenty ounces, in the common proportions of fat three ounces, and carbo-hydrates seventeen ounces = N, 205 grs. and C, 5030 grs. for the totals.

This and six others, viz.: Moleschott's, Pettenkoffer's, and Vôit's, Ranke's, that of the British Army, and two of the U. S. Army, whose figures are tabulated below, may be supposed to approximate what we want.

These last two, though shown to be much more than ample as contained in Table II, yet, when reduced in amount according to the figures on page 40, may be regarded as not much exceeding what we seek.

| | Albuminates. | Fat. | Carbo-Hydrates. | Salts. | Nitrogen. | Carbon. | Proportion of Nitrogen to Carbon. |
|---|---|---|---|---|---|---|---|
| | ozs. | ozs. | ozs. | ozs. | grs. | grs. | |
| Moleschott | 4.587 | 2.964 | 14.247 | 1.058 | 317 | 4,860 | 1 to 15.33 |
| Pettenkoffer and Voit | 4.83 | 4.12 | 12.40 | 1.06 | 333 | 4,957 | 1 " 14 88 |
| Ranke | 3.52 | 3.52 | 8.46 | .89 | 243 | 3,680 | 1 " 15.14 |
| English Army | 3.736 | 1.44 | 12.71 | .55 | 258 | 3,836 | 1 " 14.87 |
| United States Army | 5.238 | 3.07 | 13 61 | .70 | 344 | 4,942 | 1 " 14.37 |
| United States Army | 5.708 | 1.06 | 15.39 | 3.03 | 350 | 4,728 | 1 " 13.51 |
| Letheby | 2.97 | 3 | 17 | | 205 | 5,030 | 1 " 24.54 |
| Mean | 4.37 | 2.74 | 13.4 | 1.31 | 293 | 4,576 | 1 to 15.62 |

It will be seen that of these seven, the rations of the U. S. Army are the largest.

I am of the opinion that the mean of this last table, in N, and C is as near as we are now able to come to the answer of the question we are discussing. While probably not much in excess, these amounts are ample.

As an error of deficiency would be much more calamitous than an error of excess, the error should be on the latter side, if error there must be.

Difficulties of weighing and distributing, as well as the composition of foods, will interfere with absolute precision in constructing and issuing such a ration, as to grs. of N and C.

A few words must be said concerning water and salts of the food, and concerning vegetables, vinegar, pepper, coffee, tea and alcohol.

The importance of the water and salts cannot be over-estimated, but their exact and entire function is not known. It is certainly mechanical, and certainly something besides. Both are needed for nutrition, and are found in almost all food, differing in proportion in each, and incorporated in the organic compounds heretofore named.

Even where most abundant, as in vegetables, water is not found in sufficient quantity for the needs of nutrition. This deficiency is supplied by drinking.

The salts, ordinarily, are found in the foods in sufficient quantity, with the one exception of the sodic chloride. Of this latter ordinary food does not furnish a sufficiency, and almost universal experience has proved the necessity of furnishing a special supply.

It is worthy of remark that the ration of the U. S. Navy does not contain salt as one of its components. Nevertheless, Jack Tar feels the need of it, and buys it. The explanation of this absence is probably found in the idea that sufficient salt is found in the salt meat.

In the rations, where salt meat is the staple, salts are found in great amount (3 ozs. and upward). In all the other rations more than half an ounce is found; independent of a special issue. Preponderance of salts in the food causes disease.

Of common salt half an ounce is an abundant issue.

Vegetables contain all the food principles necessary to life. A man may live on them alone; some claim with better health and development than living on animal food. They cannot be considered an important part of the ration issued by government to the soldier, as nutritive power in proportion to weight is small; their proportions of N and C are small, and the large amount of water they contain make them too bulky, too difficult of transportation and too perishable for a regular article of issue. Of the potato, the vegetable of perhaps the greatest nutritive value, ten pounds is not an inordinate amount for a man's daily consumption. Special health-giving or restoring qualities, however, make them suitable for special issue, either in addition to or in place of some other food; but as a regular diet, military authorities are almost unanimous in discarding vegetables.

Partly on account of this deficiency, vinegar or lime juice is frequently issued, and seems to make up therefor in a great degree. Vinegar is grateful to the palate and a stimulant to digestion. It should be issued one-third of a gill daily.

Pepper is also appetizing and aids digestion. It is issued to most armies, and should be. Twenty grains is an ample allowance.

Coffee and tea are generally issued as part of the daily diet. I believe coffee preferable to tea for this purpose. Its value, in hot infusion, is out of all proportion to its N and C.

The results of many experiments, made to determine the exact effects of coffee ingested, are so inconsistent, that we must regard them as yet undecided. All unite in lauding coffee. In my own observation with troops I have found it to fortify the body and aid it in resisting fatigue and so-called malaria. The allowance of coffee should be 1 oz. daily. The amount issued to the American soldier is vastly larger than that issued in any other army.

Without attempting to argue as to the value of alcohol, I will only here record my views, that its daily issue is unadvisable, but that it should be kept on hand and issued when recommended by the medical officers.

From all of the foregoing we seem to be led to the conclusion that a diet containing N, 293 grains, and C, 4576 grains, is ample for the diet of the soldier in war and in peace, and that heretofore the amount needed has been over-estimated. I give below two rations differing considerably in nutritious principles and nutritious value. (See pages 46 and 47.)

The mean* of these two rations will equal N, 300 grains, and C, 4964 grains, and to obtain this mean they may be issued alternate days, or weeks, or other period of issue. These amounts do not much exceed the amounts spoken of as ample on the preceding page.

All of the foregoing articles may be exchanged for other articles of food of equal

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* It is interesting to note that this mean is less than the mean of the 23 diets in Table II by only N, grs. 16, and C, grs. 55, while it has precisely the same amount of N, and 164 grains more of C than Pavy's assumption of what is daily required.

money value. Molasses or syrup may be issued in lieu of sugar, at the rate of two gallons, in lieu of fifteen pounds of sugar.

To troops traveling or in the field, when it is impracticable to cook rations, may be issued, per 100 rations, in lieu of the usual meat portion of the ration, 75 pounds canned fresh beef, or 75 pounds canned corned beef; in lieu of the dry vegetable portion of the ration, 33 one-pound cans baked beans; or 20 two-pound cans baked beans; or 15 three-pound cans baked beans; or 5 one-gallon cans baked beans.

Three pints of liquid coffee per man may be issued daily in lieu of the sugar, and coffee component, to troops traveling upon cars, and having no facilities for cooking coffee, the cost not to exceed twenty-one cents per day.

In all discussions concerning the components of soldiers' rations and their amounts, and particularly with regard to vegetables and variety in the diet, I must again emphasize the fact, that either by the soldier himself, or the military authorities for him, a system of sale, interchange, or barter, will always prevail. The food not needed or desired will be exchanged for food that is needed or desired.

To summarize: I have tried in the foregoing to show the difficulties in determining the exact—the least—amount of food that will suffice for the soldier in the exigencies of service; I have given the rations of different armies, and the diets devised by various observers and experimenters; compared them, discussed their bearings, and shown that in general they err on the side of amplitude. I have shown that soldiers, as regards their demand for food, are to be classed in the category of active laborers; that, besides the nutriment that a food contains, we must also consider cost, facility of transportation, and personal preference, in fixing a soldier's diet.

I conclude that the soldier's ration should contain about 293 grains N, and 4576 grains C, and that considerable variations in the relative proportions of these elements, as well as in those of the food principles, and in the bulk of the food ingested, are consistent with health.

I suggest two rations for armies in temperate latitudes, or even for general use, whose proportions of N and C are N, 300 grains, C, 4964, not claiming, however, for these rations peculiar excellence, but that they are sufficient and in a convenient form.

Finally, I emphasize the fact that sale, barter and interchange of foods, in practice, will always give the soldier suitable variety.

## RATION A.

| Articles. | Amount. | Albuminates. | Fatty. | Carbo-Hydrates. | Nitrogen. | Carbon. | Remarks. |
|---|---|---|---|---|---|---|---|
| | ozs. | ozs. | ozs. | ozs. | grs. | grs. | |
| Fresh beef | 22 | 2.739 | 1.5338 | | | | |
| Flour | 14 | 1.54 | .28 | 9.842 | | | |
| Peas | 2.4 | .528 | .048 | 1.272 | | | |
| Sugar | 2 | | | 1.930 | 332 | 4,297 | The totals include only the beef, flour, peas and sugar. |
| Coffee | 1 | | | | | | |
| Vinegar | ½ gill | | | | | | |
| Salt | .5 oz. | | | | | | |
| Pepper | 20 grs. | | | | | | |
| Yeast powder | .64 oz. | | | | | | |
| Total | 40.4 oz. | 4.807 | 1.8618 | 13.044 | 332 | 4,297 | |

## RATION B.

| Articles. | Amount. | Albuminates. | Fatty. | Carbo-Hydrates. | Nitrogen. | Carbon. | Remarks. |
|---|---|---|---|---|---|---|---|
| | ozs. | ozs. | ozs. | ozs. | grs. | grs. | |
| Salt fat pork | 12 | 1.176 | 5.868 | | | | |
| Hard bread | 14 | 2.184 | .182 | 10.276 | | | |
| Peas | 2.4 | .528 | .048 | 1.272 | | | |
| Sugar | 2 | | | 1.930 | 268 | 5,631 | The totals include only pork, hard bread, peas and sugar. |
| Coffee | 1 | | | | | | |
| Salt | .5 | | | | | | |
| Pepper | 20 grs. | | | | | | |
| Yeast powder | .64 oz. | | | | | | |
| Vinegar | ½ gill | | | | | | |
| Total | 30 ozs. | 3.888 | 6.098 | 13.478 | 268 | 5,631 | |

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# ON STRETCHERS AND STRETCHER SLINGS.

## DES BRANCARDS ET DE LEURS ATTACHES.

## ÜBER TRAGBAHREN UND TRAGBAHR-RIEMEN.

BY JOHN DENNIS MACDONALD, M. D., M. R. C. S. ENGLAND.

Inspector General of Hospitals and Fleets in Her Majesty's Army (retired).

### EXHIBITION OF DRAWINGS AND MODELS—THREE EXHIBITS.

The recognized importance of providing for the transport of the wounded in action, in such a manner as to be alike easy to both bearer and patients, has given rise to numerous appliances, each with its own special advantages; but the common stretcher, though modified in various ways, is still quite indispensable in the field. I may therefore without further preface enter upon the description of certain improvements that have suggested themselves to my mind, both as it respects (1) Stretchers and (2) Stretcher Slings.

### I. STRETCHERS.

A Stretcher may be said to consist of four essential parts, viz.:—

1st. The two side poles.

2d. Two cross pieces, to keep the poles apart.

3d. A piece of canvas stretched between the poles.

4th. Four feet, to raise the stretcher from the ground.

*N. B.—To the above a pillow should be added for use especially in Ambulance Wagons.*

1. THE SIDE POLES.—The Poles of the Army Regulation Stretcher are seven feet three inches in length, but by shortening the after handles they might be conveniently reduced to six feet four inches, and if the transverse measurement is reduced a quarter of an inch, while the same amount is added to the vertical, the sectional area would be less by one-quarter of an inch in the first place, and still less by the rounding of the upper angles; so that even with this small reduction in the weight the vertical resistance would be actually increased.

2. THE CROSS PIECES (SHEET 1, FIG. 1).—These each consist of two parts with a hinge joint, so as to admit of the poles being brought together when not in use. In the accompanying plate, an important but simple alteration will be seen in the mechanism of the hinge, by which reduction in weight is effected, while the adjustment and folding up are rendered more easy. It should be remarked, however, like everything else of the kind, that the model is capable of improvement, both in material and workmanship, should its utility be recognized.

3. THE FEET (FIG. 2).—In the new regulation Stretcher the feet are furnished with wheels, or rollers at the ends, and are either fixed, or may be folded up or extended as required. It is in the mechanism connected with these movements that I have to propose the alterations shown in Sheet 1, Figure 2, A and B.

The frame of the leg consists of two curved flat pieces about one-eighth of an inch in thickness and held together, just the width of the pole apart, by transverse bolts. The upper pivot, confined by a staple plate, works beneath the pole, and a fixed bolt at the distal side of this, checks any further movement of the leg in the same direction. Another bolt at the lower end forms the axis on which the roller turns. Finally, a little above the circumference of the roller, a fourth bolt not only strengthens the leg but forms a stop to it when folded up, so as still to admit of the free action of the roller when the stretcher is being passed into the ambulance wagon (see Fig. 2, B).

By the curvature of the leg plates, giving a little more weight on one side, the roller is thrown to the other side of the perpendicular, so as to secure its fixity when brought up to the stop. Legs so constructed always fall into right position when the stretcher is taken up or laid down, but they must be folded up when the stretcher is passed into an ambulance wagon. In the present case, the inner plate of each leg is much less curved than the outer one, the space available being more restricted. But this rather adds to the strength of the leg, while the weight is somewhat reduced. If preferred, however, it would be easy to make both alike, and thus also simplify the whole arrangement.

Finally, it may be stated that with legs six and one-half inches long, and rollers three inches in diameter, the Stretcher would be raised eight inches from the ground, which would be quite enough for all practical purposes.

### REFERENCES TO THE FIGURES (SHEET 1)—NEW CROSS PIECE AND LEG, FOR STRETCHERS.

Fig. 1. Self-acting hinge Cross piece.
- (A) Extended and stopped at the ends.
- (B) Hinge slightly doubled on itself.

Fig. 2. New pattern Stretcher leg.
- (A) Extended, to rest on the ground.
- (B) Drawn up, to roll into Ambulance Wagon.

## II. STRETCHER SLINGS.

The present Regulation Stretcher Sling, consists of a single broad and long strap of leather, with a loop at each end, to be passed over the handles of the stretcher. This is doubtless a very simple arrangement, but it has several disadvantages. Thus, in the first instance, although the strap passes over the shoulder on each side, the chief weight falls upon the root of the neck, just over the spine of the seventh cervical, or "vertebra prominens," and cannot be long borne in the same place, which necessitates shifting the position of the strap, until finally it becomes unbearable, galling the surface where its contact has been most persistent. Again, though it fits so badly, it is so easily put on

# SHEET 1.

## NEW CROSS PIECE & LEG FOR STRETCHERS.

Fig. 1.

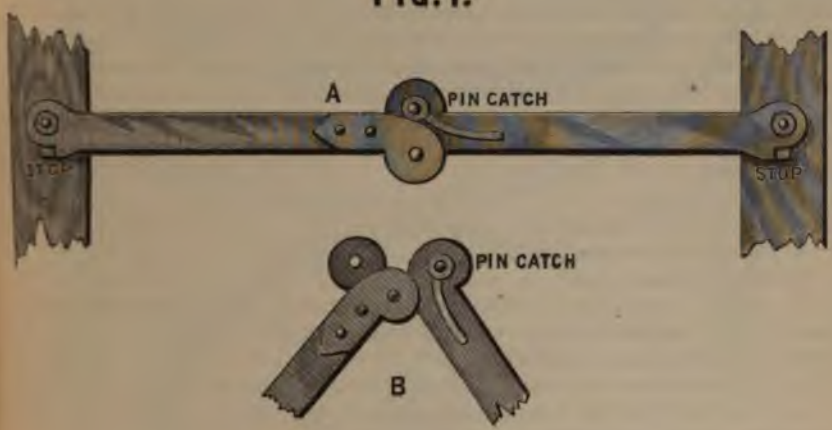
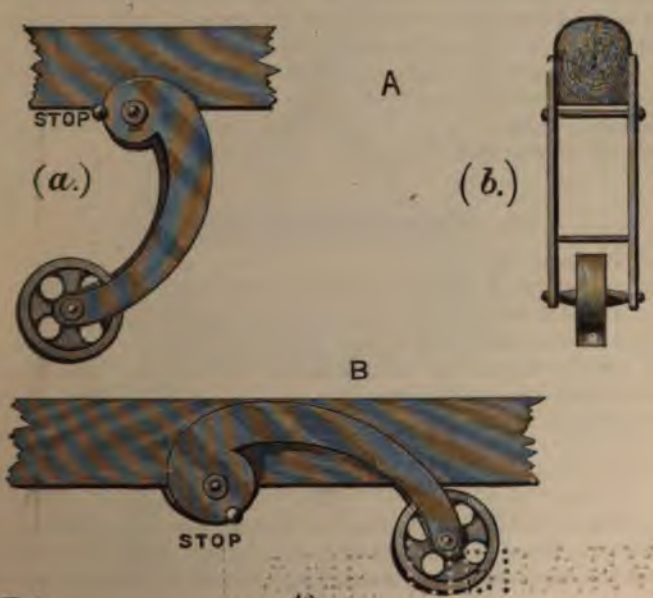



Fig. 2.



and taken off, that it is often mislaid and not to be found when wanted. This has been a matter of experience in some of our late wars. Moreover, the crouched position of the bearer while he is passing the looped ends over the handles of the stretcher, renders the first step in raising the stretcher from the ground rather difficult. It stands to reason that the more comfortable the work of the bearer is made, the more comfortable must be the patient; but this remark applies more especially to long distances, that may at any time add to the difficulties of transporting the wounded. With the view of meeting the important requirements here intimated, it occurred to me that the weight might be more equally distributed over the body, and that the shoulders, *loins* and *hips* might be made to take their part in the matter, with relief to the hands and arms (which are too heavily taxed at present) and more general ease and freedom. To effect this, it is obvious that a waist belt and shoulder straps would be necessary, with the means of connecting both with the stretcher. Indeed, a shorter summary than this, of the apparatus now to be described, could scarcely be given; and just as in the case of the stretcher, the new combination stretcher slings may be said to consist of four essential parts, viz. :—

1. The waist belt.
2. Shoulder straps and braces.
3. Sliding hook straps or frogs.
4. Stretcher-ring straps.

1. THE WAIST BELT (FIG. 1, SHEET 2).—This requires no special description, but to state that it is fastened with an ordinary buckle, and it is of sufficient length to suit men of all sizes by simple adaptation.

2. THE SHOULDER STRAPS OR BRACES (FIG. 2) are connected, by a stud, with a piece of leather of nearly the same width, doubled upon itself, so as to be capable of sliding on the waist belt into the required position.

3. THE SLIDING HOOK STRAPS OR FROGS (FIG. 3) slide upon the waist belt, each carrying a hook below for the stretcher-ring straps and a buckle above for the corresponding shoulder strap or brace.

4. THE STRETCHER-RING STRAPS (FIG. 4) are very similar to the last, only that the open end carries a ring to be connected with the frog hook, while the larger loop at the lower end receives the stretcher handle. Should the system advocated in this paper be adopted, it would be convenient to have the ring straps permanently fixed to handles of the stretcher by suitable staples driven into the wood.

A very good stretcher ring can be made with a piece of rope having a running eye at one end and the ring fixed at the other (see Fig. 5).

## REFERENCES TO THE FIGURES (SHEET 2).

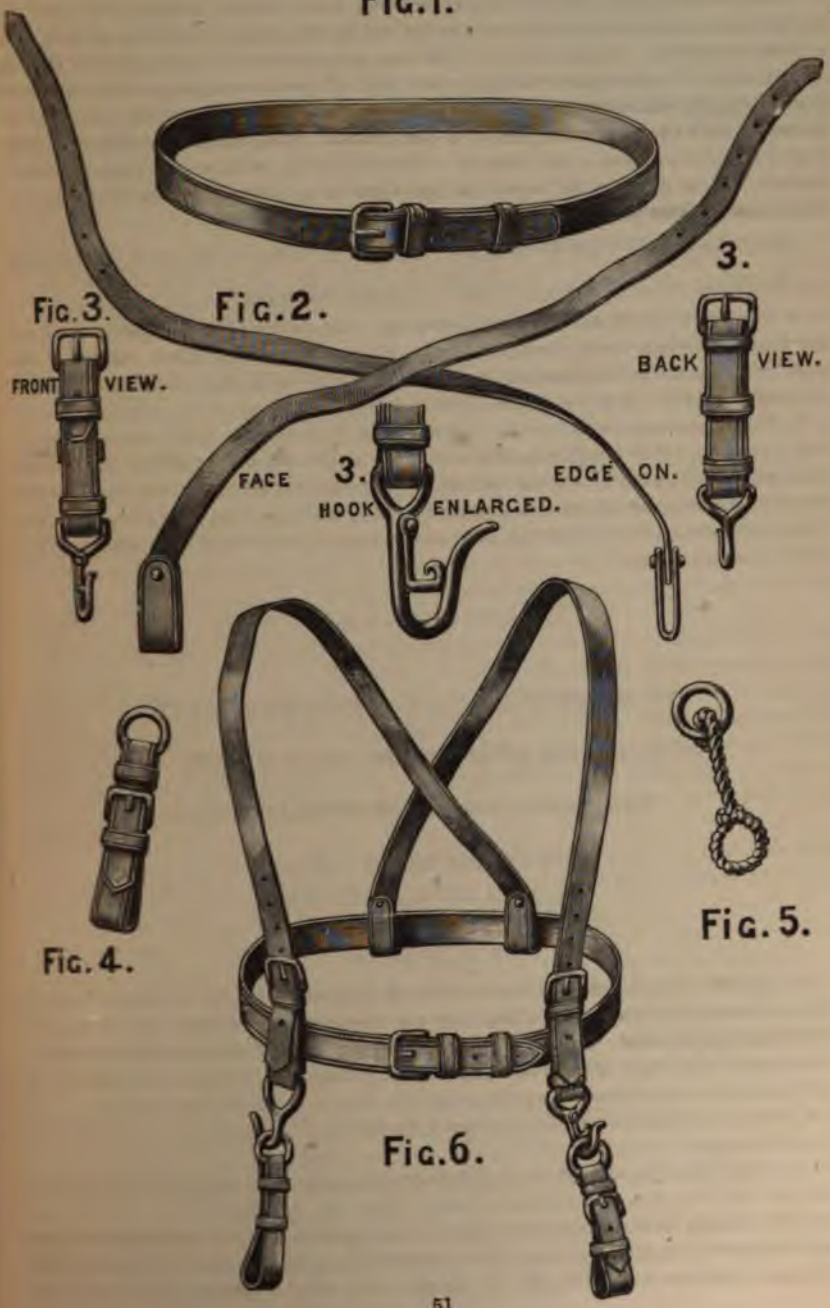
Fig. 1. The waist belt.
Fig. 2. A shoulder strap or brace,—front and back view.
Fig. 3. A sliding hook strap or frog,—front and back view.
Fig. 4. A stretcher-ring strap.
Fig. 5. Another form of the same, made of a piece of rope, with a running eye at one end and a ring at the other.
Fig. 6. A sketch of the whole arrangement.

## CONCLUDING REMARKS.

At my request, Fleet-Surgeon Norbury, M. D., C. B., who has had much experience in Ambulance work, supervised some trials of these slings at the R. N. Hospital, Plymouth, and the results were very satisfactory, the Bearers declaring that they could

# SHEET 2.

## NEW PATTERN STRETCHER SLINGS.



carry with them for miles without inconvenience. We found that the point of suspension must be well in advance of the hip, by which means pressure on the stomach was entirely obviated.

Though the hooks were comparatively small and shallow, there was so little tendency for the rings to be displaced or jolted out by irregular movements, as to be quite a remarkable fact. I might say that this was also observed by the captain of H. M. S. "Cambridge," in some trials made by him, and elicited the suggestion that the hooks might be made still more shallow, with advantage, to facilitate the disengagement of the stretcher with the additional weight of the patient. Still, that no possible evil should arise in this way, I had a new form of hook constructed, with a catch under voluntary control, and so planned as to prevent dislodgment by any casualty or carelessness of the bearers. This will be seen in the models and in Fig. 3, B.

Fleet-Surgeon HENRY F. NORBURY, M.D., C.B., being absent, wrote as follows to the President of the Section in regard to the preceding paper:—

"With reference to the slings and stretcher of Inspector General Macdonald, I may say that I entertain the highest opinion of them. I have had great experience with such things in the field, especially in the wars against the Kaffirs, and also in the Zulu campaign of 1879, when I was the Principal Medical Officer of the Southern Column of Invasion, and organized the first Bearer corps ever used in South African warfare; and I must say, that Dr. Macdonald's principle of causing the weight of the stretcher to be supported by the Ilia of the bearers, equally with the shoulders, enables a wounded man to be carried on his stretcher more steadily, safely, and for long distances, with a very much less amount of fatigue, than any hammock, cot, stretcher or other apparatus that I have ever seen."

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# ON STRETCHERS AND STRETCHER DRILL.

## DES BRANCARDS ET DE L'EXERCICE DE L'AMBULANCE.

## ÜBER TRAGBAHREN UND TRAGBAHR-ÜBUNGEN.

BY VALERY HAVARD, M. D.,

Captain and Ass't Surgeon, U. S. Army.

### I. STRETCHER.

The life of wounded men on the battle-field, depends in a large measure upon the promptness and efficiency with which they are removed from danger and transported to the first line of help. For this immediate removal, hand-litters or Stretchers only can be used; they have always been, and must remain, an indispensable part of the material of the ambulance corps; the principles which, in the light of modern experience, should direct their construction, must, therefore, ever be of great interest to the military surgeon.

The Field Stretcher should be of simple construction, so as not to get easily out of order, and so that it be susceptible of ready repair by unskilled labor. The component parts should be few and securely connected together, any loose or separable piece being likely to be damaged or lost. The mechanism must be plain, so that in a few minutes any soldier may be taught the manner of closing, opening and using it. The

stretcher should be as light as is compatible with safety—its weight never exceeding 24 pounds—yet strong enough to bear easily a strain of 200 pounds and the hard knocks and rough usage of a campaign. As a large number of stretchers must be taken to the battle-field, the question of bulk is important; each stretcher should be reducible to the smallest package its component parts will permit; therefore, the folding stretcher imposes itself.

For the bed, canvas is undoubtedly the best material. Tanned canvas, of a reddish-brown hue, is commended for its durability, and has, besides, the merit of not showing dirt and blood stains. Experience indicates that the canvas bed must be permanently fastened to the poles; this is best done by tacking the edges (with brass tacks) on the outside face of the squared poles. The proper length of the canvas is six feet; as tall soldiers are not rare, this length cannot be reduced, nor is it advisable to make it greater, as the benefit to the very occasional patients exceeding six feet would not compensate the increased weight and bulk of the stretcher.

The poles must be light, strong and elastic; well-seasoned ash is considered the best material for them. Bamboo poles possess many advantages, but also have, I fear, insuperable objections. They are trimmed square in order to give better hold to the canvas, legs and stretch-irons, and their ends, or handles, are rounded smooth, to be grasped by the bearers' hands. The length of the handles, that is of the part of the poles projecting at both ends beyond the canvas bed, is important; it must be sufficient to give room to the moving legs of the bearers, and to permit the rear bearer to see where he plants his feet; if too small, the edge of the canvas rubs unpleasantly against the bearers' legs, and the rear bearer walks blindly upon unseen ground, to the great prejudice of the patient; at the same time all superfluous size and bulk must be strictly avoided. Authorities mostly agree on the total length of 90 inches (7½ feet) as being the right one for the stretcher; 72 inches (6 feet) for the canvas, and 18 inches (1½ foot) for the handles, each handle, therefore, being 9 inches long.

Sliding or telescopic handles have been recommended in order to reduce the size of the stretcher and render it more portable; this advantage, however, does not compensate the disadvantages of greater complexity of construction, liability to damage and unserviceability; loose handles, shooting in and out with every movement of the stretcher, are particular obnoxious. One reason only seems to justify sliding or telescopic handles; the small size of the ambulance-wagon into which the stretcher is to be placed; hence, the necessity of reducing the length of the latter, to make it fit into the wagon.

Lastly, the poles should be solid; any deep grooving for the reception of either handles or legs must be avoided, as it necessitates an objectionable increase in the bulk of the poles or else weakens them beyond the point of safety.

The question arises whether it would not be possible to add to the comfort of the patient, in carrying him over the rough ground of the battle-field, by increasing the elasticity of the poles; if this be recognized as a desideratum, and can be effected without impairing the strength or adding to the complexity of the stretcher, it is well worthy of attention; I would suggest the insertion of a V-shaped piece of spring rubber in the continuity of the shaft near where it becomes the handle; with sliding handles, the question admits of easier solution by making these of steel, with wooden grip.

The stretcher is opened and the poles kept apart by means of two jointed sheet-irons (traverses). As the whole setting of the stretcher consists mainly in extending the stretch-irons, their mechanism is important. They should work smoothly and readily by the effort of one hand; the addition of a handle, as in the Furley stretcher, is a most excellent device; besides the ease of operating, it prevents the hand from being caught and mangled between the two joints, as often happens with the Halstead stretcher.

The legs of the stretcher can be made fast, as in the English and German regulation stretchers, or else movable and folding, as in the French and American regulation stretchers. For simplicity of construction and manipulation, fixed legs strongly commend themselves; they can be so short as not to interfere with the compact folding of the stretcher, and at the same time long enough to fulfill their object of raising the patient above the ground; a length of four inches seems the proper one. Movable legs can be turned out of the way in closing the stretcher; it is doubtful whether, thereby, any stowage space is saved, as, in most cases, they prevent the close approximation of the poles and add to the width of the package. Folding legs may have several functions, as in the French regulation stretcher, in which the upper ends of one pair of legs are made to support the head-rest; they may also be rendered necessary, as in the United States regulation stretcher, by the form of stretcher-rest used in the ambulance-wagon.

The head-rest has become a recognized feature in the field-stretcher; its usefulness is undoubted and there is no serious objection to urge against it. The stretcher, therefore, has a head (pillow-end) and a foot. A permanent pillow is impossible, and a detachable one very objectionable. The air pillow suggests itself; it can be inserted between two thicknesses of the canvas bed, and is quickly inflated, when needful, by the mouth of a bearer; whether, in practice, such a pillow would stand repeated use without leak or rupture, remains to be seen. The head-rest consists usually of the edge of the canvas bed raised a few inches above the level of the poles; this is effected automatically in the French stretcher by setting the legs, and in the Furley stretcher by extending the upper stretch-irons. The air pillow, or any other head-rest requiring an independent operation for its setting, has, I think, a twofold advantage; its mechanism is less complex, and it can be left unraised at will, in cases (as of shock, for instance) where it is best to keep the head low; it also easily admits of gradation in its elevation.

The Slings are necessary appendages to the stretcher. Their object is to throw part of the weight of the stretcher upon the back and shoulders and relieve the muscles of the arms and hands; without their help the stretcher-bearer does not use his physical powers to the best advantage. The stretcher-sling consists simply of a webbing or leather strip with a loop at one end, and at the other a strap and buckle to adjust the length. This sling is open to objections which, however, are overborne by the advantages of simplicity, lightness and ease of transfer from one bearer to the other. It is used to bind up the closed stretcher into a compact package, and for this purpose the addition of a small transverse strap, as in the English stretcher-sling, appears most useful.

From the foregoing considerations we may sum up, as follows, the main characteristics of the ideal field stretcher:—

The canvas is nailed to solid but light and elastic square poles, the rounded ends of which form the handles. The poles are 90 inches long; 72 inches covered with canvas, 9 inches at each end for the handles. The stretcher is set by means of two jointed stretch-irons, each furnished with a handle. The straight iron legs are made fast to the poles and only four inches long. The head-rest consists of an air pillow or of the edge of the canvas raised, when needful, by a simple and independent mechanism.

The relations of the stretcher to the ambulance-wagon now claim our attention.

One axiom of the modern field sanitary service is, that a patient once placed on a stretcher, must not be lifted off it until he reaches the line of substantial surgical help, that is, either the ambulance depot or the field hospital; another is, that ambulance-wagons must go as far to the front as practicable, so as to reduce to a minimum the distance over which patients are carried on stretchers. Therefore, it follows that, as the bearers coming from the scene of action with the wounded reach the ambulance

picket, stretchers and patients together are at once lifted into the ambulance-wagons; hence the inter-dependence of stretcher and wagon, and the peculiarities of construction which it involves.

Regarding the general character of the ambulance-wagon, it will suffice, here, to say that the kind intended to carry two recumbent and two or three sitting patients, or else eight sitting patients, is considered the most useful, at least in the service of the United States, and will be the only one referred to in this paper.

The principal question to consider, is the introduction of the stretcher into the ambulance. This introduction should, for the sake of both bearers and patient, be made as easy as possible: the foot of the stretcher being laid in the wagon, the rear bearer, unaided, should be able, without unusual effort, to push it into position. This is effected, in the first place, by lowering the floor of the ambulance to 40 inches, or less, from the ground, and, in the second place, by the proper use of wheels or rollers.

In the German regulation stretcher, the ends of the fixed iron legs are simply rounded off smooth, so as to slide upon the floor of the ambulance. The imperfections of this system are obvious and need no comment.

In the English stretcher, the legs are replaced by four iron brackets holding 3-inch wooden rollers; the stretcher, laid upon the edge of the ambulance floor, is rolled into position by the bearers. These rollers as a part of the stretcher, are open to objections. Bearing constantly the weight of the stretcher while resting upon all kinds of ground, they must soon lose their smoothness and become roughened; again, it must frequently happen, that mud or sand get jammed inside the brackets and lock the rollers so as to render them useless for the purpose for which they are intended.

The stretcher truck, first used in Austria, and now adopted in the French regulation ambulance, realizes a step nearer perfection. Here the rollers, instead of being an integral part of the stretcher, are a fixture of the ambulance-wagon. The truck consists of a transverse iron bar mounted on two small rollers and moving along the floor on a guiding rail; there is one on each side. The front legs of the stretcher are laid upon the truck, the stretcher pushed forward on it and finally lifted into hooks* above the floor. Resting in those hooks the stretcher is more steady than if left upon the floor, but it seems to me that sufficient steadiness could be secured with less labor.

Instead of the movable truck, we may have stationary rollers, as in the regulation ambulance of the United States. These rollers, four in number, are laid transversely upon two longitudinal bars. The legs of the stretcher being folded, the front ends of the poles are laid upon the rear roller, and the stretcher is pushed into position. This is probably the easiest and safest way to introduce the stretcher; an objection against it is that it requires the use of stretchers with folding legs, and that the latter, unless always tightly and carefully closed, will butt against the rollers and prevent smooth working.

It is now pretty generally recognized that, for the greater comfort and safety of patients, the stretcher should be borne on a special set of springs placed in or upon the floor of the ambulance-wagon. The various systems of introduction—by movable or stationary rollers—easily admit of the use of these special springs. Movable rollers (either on legs or truck) can be made to move upon iron plates which lead them to the summit of the convexity of springs partly sunk in the floor. In the stretcher-rest, mentioned as a distinguishing feature of the American ambulance-wagon, the longitudinal

* These hooks, like other features of the French ambulance, seem to have been copied from the wagon of the American ambulance used in Paris during and immediately after the Franco-Prussian War.

bars are laid on steel springs, two on each side disposed lengthwise, end to end; as far as I know, it is the only regulation ambulance-wagon provided with them.

The system of introduction is necessarily dependent upon the form of the stretcher; if the latter has folding legs the stationary rollers are best; but if it has fixed, short legs, as I believe is to be the stretcher of the future, the movable truck should be used. It is quite possible, however, so to combine systems as to obtain a maximum of advantages. For instance, we might remove the stationary rollers (rear one excepted) of the American stretcher-rest and substitute therefor longitudinal rails for movable rollers; in this way we retain the springiness of the American stretcher-rest and are enabled to introduce stretchers with fixed legs; such modification would, perhaps, give the best results yet obtained.

The importance of the subject may warrant the following practical details of my ideal stretcher-rest:—

Three longitudinal bars (one median, two lateral), connected at the ends by cross pieces, form a frame or platform resting upon springs and raised six inches above the ambulance floor. Parallel with, and slightly projecting above the rear cross piece is a stationary roller. Two trucks move in rails upon the bars, each with two slits. The front legs of the stretcher, having been raised over the rear cross piece, are placed in the slits of the truck, and the stretcher is pushed forward by means of the truck and the rear roller; the rear legs are then raised over the cross piece and the rear handles laid upon it, or, rather, upon the stationary roller. The length of the bars is such that each stretcher fits accurately in the corresponding compartment, the rear legs abutting against the rear cross piece, the front legs held in the truck, which itself abuts against a flange of the front cross piece; the steadiness of the stretcher is thus secured beyond peradventure. To unload, it is simply necessary to raise the rear legs over the rear cross piece and roller, draw the stretcher out, then lift the front legs out of the truck and over the roller. It must be borne in mind that the lowness of the floor and the shortness of the legs make the lifting of the stretcher comparatively easy. For these manipulations, three men are required.

### STRETCHERS USED DURING THE AMERICAN CIVIL WAR.

It is the opinion of all authorities that no less than 20 stretchers per 1000 men should be provided and available on the battle-field. During the American Civil War, from April, 1861 to August, 1865, 52,489 stretchers were issued to the Federal troops, or, at the rate of, at least, 25 per 1000 men. This liberal issue of stretchers, together with a sufficient supply of ambulance-wagons, afforded advantages in the transport and treatment of the sick and wounded such as had never been witnessed in any previous war.

These stretchers were of various patterns. In the beginning of the war, the Satterlee; then the regulation stretcher, was supplied to the regiments. It was heavy, bulky, non-folding, and was soon superseded by the Halstead, a folding stretcher of lighter pattern. This, with but few modifications, is still the stretcher issued to the U. S. Army hospitals. Of the other patterns used North and South during the war, it would be profitless to speak here, as they have become obsolete.

## II. STRETCHER DRILL.

The necessity of a special body of trained stretcher-bearers, attached to each division or corps of an army, is no longer a matter for discussion; it has been recognized and accepted by all civilized nations. Such a body is but the natural consequence of the great law of the specialization of duties, a law which imposes itself wherever the best results of human exertion are desired. With it, not only are the wounded more

promptly and safely removed, but, as no combatant is permitted to fall away from the ranks to carry injured comrades to the rear, the efficiency of the troops is very much enhanced.

The practical utility of drilling stretcher-bearers was recognized during the American Civil War, and the War Department order of 1864, definitely establishing the ambulance corps of the U. S. Army, provides that "it shall be the duty" of the commandant of each ambulance corps to "institute a drill in his corps, instructing his men in the most easy and expeditious manner of moving the sick and wounded, and to require, in all cases, that the sick and wounded shall be treated with gentleness and care."

From that time, but particularly since the Franco-Prussian War of 1870, the field sanitary service of most armies has been re-organized and perfected, and more and more prominence given to the training of stretcher-bearers. In 1869, instructions for the guidance of medical officers in training sick-bearers, were issued by the Prussian war office; but the credit of first elaborating a complete system of stretcher tactics belongs to Surgeon-Major Sandford Moore, of the British Army. In this system, which forms part of the "Manual for the Medical Staff Corps of the British Army," nothing is any longer left to the discretion of the bearers or their chiefs, all the movements and manœuvers are fully and accurately described; and the bearers are exercised in them with the same precision and exactness as if they were drilled in the "Manual of Arms."

In the following pages I have stated what, in my judgment, appear to be the correct rules and principles of stretcher drill, and like those of all tactics, they are necessarily subject to alterations, and it would be idle and presumptuous, in this age of transition, to aim at perfection in this or any other branch of the science of war.

### STRETCHER DETACHMENT.

How many men should be told off to each stretcher, and constitute what is called a stretcher detachment?

Experience has decided that to raise a patient off the ground and place him upon a stretcher, carry him off speedily and safely, together with his arms and equipments, and lift him up on his stretcher, into the ambulance-wagon, four bearers are necessary. The detachment should be such as to make two relays, relieving each other, so that the stretcher will be kept constantly in motion and the patient quickly removed from the zone of danger to the first line of help.

*It is better to have less stretchers, and have them more efficiently served.*

The members of the stretcher detachment have their special duties; they are numbered 1, 2, 3 and 4. In loading and unloading they have their appointed places around the patient, and are designated accordingly, as follows:—

No. 1. Foot number.

No. 2. Hip number.

No. 3. Head number.

No. 4. Support number.

No. 1 is front, and No. 3 rear, bearers; No. 2 marches on the left, and No. 4 on the right of the open stretcher. No. 4 is chief of the detachment and responsible for its work. As already stated, the four members of the detachment make up two relays which take turns in carrying the stretcher. The off relay carry the arms and equipments of the patient and give him any special care he may need in transit to the ambulance-wagon. Nos. 1 and 3 form the first relay, Nos. 2 and 4 the second; when carrying the stretcher, Nos. 2 and 4 become temporarily 1 and 3; whatever duty No. 4 may discharge as a member of the detachment he retains his authority and remains responsible as chief of detachment.

Four detachments form a section, under charge of a sergeant, designated chief of

section, and six sections (or whatever number assigned to the ambulance organization at a division) constitute a Bearer company.

The duties of stretcher-bearers are particularly exacting and laborious; they demand, at least, as much courage and endurance as are required from the combatants on the line of fire, and more judgment; they should be, therefore, cool, reliable and intelligent men. They must be of average height, that is, not less than 5 feet, 4 inches and not more than 5 feet, 10 inches. The four bearers of a detachment should not vary in height more than one or two inches.

### PRELIMINARY DRILL.

It is, of course, only possible here to indicate in broad outlines the execution of movements and manœuvers, leaving out tactical details and words of command.

The detachment is formed from rank to column, numbered from front to rear, 1, 2, 3, 4, each number covering the number in his front at easy stepping distance, 30 inches. No. 2 steps out to the stretcher (lying closed and strapped behind the detachment), takes it up on his right shoulder at a slope of 45°, pillow end up, and returns to his position. He "grounds stretcher," by laying it upon the ground on the right side of the detachment, so that the handles are opposite the feet of Nos. 1 and 3, pillow end to the rear and canvas uppermost. From this position the stretcher is lifted (or else directly taken from the hands of No. 2) by Nos. 1 and 3, who hold their respective ends with the right hands at the full length of the arm. With the closed stretcher thus lifted, the detachment can be marched and manœuvred, the four numbers remaining in column: No. 2 between the bearers, and No. 4 behind, superintending the movements and, if necessary, giving the words of command. The stretcher can be transferred, without halting, by 1 and 3 to 2 and 4, and *vice versâ*.

WITH CLOSED STRETCHERS.—A properly constructed stretcher is so quickly and easily opened and closed that whenever the bearers have to proceed any distance (away from ambulance-wagons) before reaching the wounded, it will be found best to carry the stretcher closed until they come within the sphere of active operations. Drill with closed stretchers is therefore useful and must not be overlooked.

The detachments can be marched in column of sections, half-sections or detachments. The column of half-sections is the habitual column of march, and in the field any other will seldom be necessary. Two detachments abreast, by closing the interval to one yard, or even less if required, will be able to march on any country road without unduly extending the length of the column. If the middle of the road is occupied, the twos divide, the right and left detachments marching on their respective sides of the road, and re-unite when the obstacle is passed.

On approaching the field, the sections separate, each one marching under its chief to the part of the line assigned to it. Each section then changes its order of march from column of half-sections to column of detachments; at the proper point it is halted and the stretchers are opened; if deemed best, the detachments may, before opening stretchers, be wheeled into line, each detachment wheeling on its own ground.

WITH OPEN STRETCHERS.—The stretcher, grounded on the right side of the detachment, as already explained, is opened and set by Nos. 1 and 3, who then step between the poles and take up their slings. To lift the stretcher, Nos. 1 and 3 stoop, slip the loops of the slings over the ends of the poles and firmly grasp the handles. Both being ready, No. 3, after a premonitory "ready," calls out "up," when they slowly raise the stretcher off the ground and stand up, holding it at the full length of the arms. The moment they stand up, No. 4 steps to the centre of the stretcher on the right side, opposite No. 2.

The bearers, in lifting and grounding the stretcher, must work nicely together, so

that both ends will be raised and set down simultaneously, gently and without jolt. The rear bearer watches the front bearer and moves in perfect accord with him.

Habitually, the detachment marches in the position described above, No. 2 on the left and No. 4 on the right of the stretcher. Whenever the nature of the ground, or of the road, does not permit Nos. 2 and 4 to march by each side, No. 4 falls back behind the rear bearer, and No. 2, if necessary, marches in front of No. 1.

### TO MARCH WITH OPEN STRETCHERS.

In order that patients may be carried with as little risk and discomfort as possible, the mode of progression (step and gait) of the bearers should be such as to impart no unpleasant swinging motion, rough impulse or jolt to the stretcher. In other words, the bearers must take the stretcher step, very different from the regular military step, and demanding much practice in its acquirement. It is a broken step, and is best exemplified in the horse, to which animal we may compare a stretcher borne by two men; in walking, the horse touches the ground with only one foot at a time, the four hoofs making four distinct and equidistant sounds as they strike the ground. To imitate this step, the front bearer starts with his left foot; the rear bearer follows with his right; the front bearer's right foot next touches the ground, followed by the rear bearer's left foot; the four feet being planted successively and at even intervals.

The advantages of the horse-step are twofold. First, it saves the stretcher as much as is possible, from the forward lateral swing or curve which the body naturally describes in walking. In the second place, instead of the strong impulse which, when stepping together, shakes the stretcher at each step, it imparts to the stretcher a series of small impulses, to some extent, neutralizing one another. The difference between the broken step (horse-step) and the step where two feet strike the ground together is exactly that existing in horses between the single stepper and the trotter; a patient might ride the former in comfort who would not be able to ride the latter at all.

Next to the broken step, the left-and-right step. or that in which the bearers strike the ground together but with different feet (as the horse in trotting) is the best, as it neutralizes the swinging lateral motion so objectionable in the regular military step. In taking the left-and-right step the front bearer always starts with the left foot, the rear bearer with the right.

As stated before, the horse-step demands much practice; in view, however, of the singular ease and comfort it gives the patient, it is worth the time and labor bestowed upon it. In my opinion, to teach bearers to step together, either with the same or different feet, is a mistake. If the bearers cannot take the horse-step, then *let each one step independently, without any reference to the other, provided they avoid keeping step and they move evenly and equally fast.*

The other peculiarities of the stretcher-step, as well as the general rules for the carriage of the stretcher, so fully described by Longmore and others, need no discussion here.

To change direction while marching, the stretcher detachment, with closed or open stretchers, wheels on a movable pivot, that is, describes a quarter-circle whose radius is about three yards.

To wheel, being at a halt, experience shows that, with either closed or open stretcher, the movement is best executed by revolving the stretcher upon its own centre, both bearers describing an equal curve, one to the right. the other to the left.

In drilling several detachments with open stretchers, the intervals should be extended to four paces, so as to permit each detachment to wheel about on its own centre.

With open stretchers, the column of detachments is the habitual column of march. From this formation, the detachments can be wheeled to the right or left into line, or wheeled about to the rear.

LOADING AND UNLOADING STRETCHERS.

The three successive steps by which a patient is placed upon a stretcher are as follows :—

1st. He is lifted off the ground by the four bearers of the detachment.

2d. The stretcher is laid immediately under him by one of the bearers (No. 4).

3d. He is lowered on the stretcher by three of the bearers (Nos. 1, 2 and 3) assisted by the fourth.

Their execution demands nicely concerted action, and more care and dexterity than strength. The bearers must so place their arms and hands under the patient that his weight is evenly distributed among them. No. 1 attends to the lower extremities; Nos. 2 and 4 to the pelvis and back; No. 3 to the head and upper extremities; No. 4 places the stretcher under the patient; as chief of detachment he gives the words of command.

To exercise in loading stretchers, the detachments being in line with open stretchers, a party of men representing the wounded, dressed in fatigue suits, are directed to lie down in a row, seventy paces in front of the detachments, each man opposite a stretcher. The "wounded" will at first lie with their heads toward the stretchers; afterwards, as the bearers become more experienced, they may lie in any direction, but still in a row. Later, they are distributed at random over the drill grounds.

What should be the position of the stretcher with reference to the patient?

*The stretcher is placed by the side of the patient, in a line parallel with the patient's body and one pace distant from it, the pillow end corresponding to the patient's head.*

The bearers should be exercised in loading with the stretchers placed on one side and then on the other. On the battle-field, the question of the side on which to lay the stretcher is determined by two conditions: the nature of the ground and the side on which the patient is wounded. The stretcher must be placed where it will lie evenly and safely, but when both sides are available the stretcher should be on the opposite side to that on which the patient is wounded; this is in order that the bearers may approach the patient on the wounded side.

The stretcher being grounded, the members of the detachment step out to their proper places around the patient. The rule is for Nos. 1, 2 and 3 to go to that side of the patient which is furthest from the stretcher, and for No. 4 to stand between the patient and the stretcher.

If the stretcher is on the right of the patient, No. 2 steps briskly by the patient's feet to his off-side until he comes opposite the hips; No. 1 follows him and stops opposite the knees; meanwhile No. 3 steps directly around by the patient's head and stands opposite the shoulders, and No. 4, going around the head of the stretcher, places himself opposite No. 2.

If the stretcher is on the left of the patient, the bearers take the same relative positions around him, No. 2 going round by the foot of the stretcher to his off-side, while No. 4 simply turns around so as to face No. 2.

Nos. 1 and 3, as soon as they reach their places, lay their slings on the ground, the former by the patient's feet, the latter by his head.

They all stoop down, without kneeling, placing one foot in advance of the other, to steady themselves, and proceed to lay hold of the body. No. 1 passes both arms under the lower limbs (one at the knees, the other at the ankles); Nos. 2 and 4 pass their hands and arms (side by side, not locking hands) under the patient's loins and thighs, one above and one below the hips; No. 3 passes one hand under the patient's neck into the opposite axilla, and the other under the shoulder nearest to him. As it facilitates lifting, the patient is directed to clasp both arms around the neck of No. 3.

After a premonitory "*Ready*" No. 4 commands "*Up*," when the bearers, acting together, slowly lift the patient off the ground, carefully maintaining him in the hori-

zontal position. Nos. 1, 2 and 3, having secured their hold, using the knees as a means of support, No. 4 relinquishes his, goes round the head of the stretcher to the centre of the pole furthest from the patient, lifts the stretcher and places it under the patient; he then commands "*Down*," and assists in lowering him upon it. The bearers very gently remove their hands from under the patient, and, by the shortest way, proceed to their places; Nos. 1 and 3 take a side step over the near pole, pick up and put on their slings and stand ready to lift the stretcher; Nos. 2 and 4 are on each side.

It is essential, whenever the ground permits it, to place the stretcher exactly under the lifted patient, so that the bearers will have but to lower him upon it without moving their feet. On no account is the patient to be turned around so that his head may correspond with the pillow end of the misplaced stretcher.

In the field, especial attention must be paid to the seat of injury in lifting patients. The wounded parts must be placed and supported in their normal relations. In fractures, the supporting hands should gently draw the fragments of the broken bone away from each other. In flesh wounds, the parts should be relaxed. These rules are best observed by having, as described above, Nos. 1, 2 and 3 on the wounded side. In case of a fractured arm, the limb is gently laid across the body, and, as far as practicable, kept there by No. 3. In case of a fractured lower extremity, No. 1 supports the limb with one arm above and one below the seat of fracture. No. 4, instead of exactly facing No. 2, may shift his position toward the head or feet of the patient, so as to give better support to the wounded parts.

To unload, the process is reversed: Nos. 1, 2 and 3 on one side, and No. 4 on the other, lift the patient; No. 4 removes the stretcher and then assists the other Nos. in lowering the patient to the ground.

The bearers should also be practiced in loading and unloading the wounded as they are found in battle, that is, scattered over the field, armed and equipped. Each section, in command of its chief, is assigned to a part of the field, to which it marches in column of detachments. As each wounded is approached, the chief of detachment runs ahead to ascertain the nature of the ground and the proper place for the stretcher; as the latter is grounded, he and No. 2 proceed at once to their appointed places on each side of the patient; one takes the rifle and lays it down out of the way; the other removes the accoutrements and knapsack. The patient being placed upon the stretcher, Nos. 2 and 4 pick up the arms and equipment, the stretcher is lifted and the detachment falls in column with the other detachments of its section.

This exercise can be rendered still more realistic, and therefore more practically useful, by indicating the location and nature of the injuries in each wounded. Assuming that all the wounds are from gun shot, the holes of entrance and exit of the bullet are marked by a round red tag pinned to the clothing; a larger wound, such as may be produced by ball or shell, is marked by a larger tag with scalloped edges. If there be hemorrhage, the tag of the bleeding wound is long and slender. If there be fracture, its seat is indicated by a white tape tied around the limb. Before lifting up the patients upon stretchers the bearers apply such dressings as the injuries thus marked may require.

### LOADING AND UNLOADING WITH REDUCED NUMBERS.

Emergencies and casualties will not unfrequently occur in warfare, reducing the stretcher detachment to three, or even two, men; under these altered conditions the bearer should know how to operate to the best advantage.

*With three bearers*, as with four, the stretcher is always placed by the side of the patient. Nos. 1 and 3 go to the off-side of the patient, while No. 2 (acting chief of

detachment) stands on the stretcher side, facing No. 3. The patient being lifted, and his arms around the neck of No. 3 No. 2 relinquishes his hold and places the stretcher under the patient.

In the field, to load with three bearers, the rule is for Nos. 1 and 3 to place themselves on the injured side, that they may better support the wounded parts. They shift their positions toward the head or feet of the patient, according to the seat of the injury; for instance, in wounds of the head or upper extremities, especially when the patient is unable to help himself, No. 3 should place his arms as described in loading with four bearers, while No. 1 passes one arm under the back and the other under the thighs, letting the feet hang down.

*With two bearers*, the stretcher admits of two positions; by the side, or at the head, of the patient. In the first position both bearers place themselves on the off-side of the patient, facing the stretcher, and, after lifting, carry him to the stretcher.

In the second position, the stretcher, instead of being parallel with the patient's body, is placed in a line with it, and one pace beyond it, the foot of the stretcher corresponding to the head of the patient. The bearers place themselves one on each side of the patient, and, locking hands, lift him on the two-handed seat and carry him, head-foremost, over the foot of the stretcher. In unloading they carry him, head foremost, over the head of the stretcher.

In the field, the loading of the patient on the two-handed seat being the easiest for the bearers and safest for the patient, the second position, therefore, will generally be preferred. In case of injury (especially fracture) of the lower extremities, the first position is the best, as it permits No. 1 to support and steady the wounded parts.

### RIFLE STRETCHER.

In spite of every precaution, it will sometimes happen that stretchers cannot be obtained and must be improvised. Perhaps the readiest and most efficient substitute for the regular stretcher, in the field, is the rifle stretcher, made with a blanket and two rifles (bayonets fixed).

The blanket is spread evenly on the ground; the rifles are laid under the edges of the blanket, muzzles to the front and somewhat converging, butts to the rear; the blanket is then rolled tightly around the rifles, a like number of rolls around each, until the space between them is reduced to about 20 inches.

It is necessary to place the rifles so that their muzzles converge under the blanket, otherwise, owing to their irregularly conical shape, they would not be parallel after being rolled.

The rifle stretcher is carried by four men, two on each side; each man takes a firm grasp of blanket and rifle (the latter with hammer downward), placing one hand at either end of the rifle and the other near the middle, taking care not to let the blanket slip.

### LOADING AND UNLOADING AMBULANCE-WAGONS.

The subject of loading and unloading ambulance-wagons is of such vital importance in the field that it must necessarily be included in any scheme of stretcher drill.

The U. S. Army regulation ambulance-wagon is a two-horse four-wheeled vehicle, constructed to carry two wounded recumbent and two sitting beside the driver, or else, eight men in a sitting posture. As already mentioned, the limited length of available floor and the form of the stretcher-rest require the use of stretchers with sliding handles and folding legs.

Ambulances in the proportion of two to each section, or one to every two detachments, are drawn up in a line, at six yards interval, and with their rear toward the drill ground. The stretcher detachments are formed in line, thirty yards front, and

facing the rear of the line of ambulances, extended to four paces intervals, and the stretchers opened in the usual way.

The "wounded," with or without arms and equipments, are marched up to the stretchers and directed to lie on them; Nos. 2 and 4 of each detachment rid them of their arms and equipments if they have any.

As only one stretcher can be introduced at a time in the same ambulance, the right detachment loads first, and then the left.

The detachment moves forward; when about ten yards from the ambulance Nos. 2 and 4 run ahead, lay in their proper places in the ambulance the arms and equipments of the patient, make sure everything is ready for his reception, then return to the stretcher, which, in the meantime, has been grounded, one pace from the rear of the ambulance.

The manner of lifting and introducing the stretcher must vary according to the construction of the stretcher and ambulance used. Where the floor of the latter is high, as in the English and French ambulances, the four bearers are required, two on each side. In the regulation ambulance of the United States, the lowness of the floor permits the rear bearer (No. 3) to lift his end of the stretcher to the proper altitude, while Nos. 1 and 2 lift the front end and lay it upon the rear roller, No. 4 meanwhile directing the movement. With a low floor and two rear steps placed at easy intervals, it would be possible for two bearers to introduce the stretcher, the front bearer stepping up into the ambulance while the horizontal position of the stretcher is maintained by the rear bearer.

The stretcher should be introduced as brought, foot first, so that (as when carried on his stretcher) the patient will face the way he is going.

*With the U. S. regulation ambulance*, the position of the bearers in loading and unloading, on either side, seem best as follows:—No. 1 stands on the side of the stretcher corresponding to the outside of the wagon; Nos. 2 and 4 stand on the side corresponding to the middle line of the wagon, while No. 3 remains between the rear handles. In these positions Nos. 1 and 3 are enabled to lay their slings down on the outside of the stretcher, out of the way.

To load, Nos. 1 and 2 face toward the stretcher, stoop, push in the handles and take hold of their respective poles, placing one hand near the end and the other near the centre, palms upward; at the same time, No. 3 grasps the rear handles. After a premonitory "*ready*," No. 4 commands "*up*," when they, slowly and simultaneously, raise the stretcher to the level of the ambulance floor and step up to it; Nos. 1 and 2 lay the front end of the poles upon the rear roller of the stretcher-rest, then close the legs front and rear on their respective sides; No. 3, gently and steadily, rolls the stretcher into position, assisted, as far as may be needed, by Nos. 1 and 2, and pushes in the rear handles.

Nos. 1 and 3 having recovered their slings (which they carry folded in the right hand), the detachment forms in column facing to the rear and marches back to its original position in the line.

To unload, the detachment advances directly to the middle of the rear step of the wagon; Nos. 1 and 3 take a side step to the right or left (according to the side the stretcher is on) and lay their slings down on the outside; No. 2 takes a step to the front; No. 4 goes wherever his presence may be required. Nos. 1 and 2 let down the tail gate; No. 3, stepping forward between them, pulls out the rear handles of the stretcher, and, taking hold of them, slowly but steadily draws the stretcher out until the rear and front legs have cleared the rear roller, when he halts; Nos. 1 and 2 quickly open the legs and then take hold of the front ends of the poles with both hands, as in loading; at the words of command the three bearers lift the stretcher clear of the wagon and ground it one pace to the rear.

TO TRANSFER A PATIENT FROM THE STRETCHER TO THE BED.

The stretcher being placed close alongside the bed (on either side), the patient's head corresponding to that of the bed, two or three bearers stand on the outside and lift the patient in the usual manner; the stretcher being removed by another bearer, they take a step forward and lay him down upon the bed.

The stretcher bearers, to be accomplished, should also be trained in carrying stretchers up and down stairs, and across or over the various obstacles which may be met in the field, but these are subjects to which I can simply allude in closing.

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# TRANSPORTATION OF THE SICK AND WOUNDED OF ARMIES ON LAND.

TRANSPORTATION DES MALADES ET BLESSÉS DES ARMÉES.

LANDTRANSPORT DER KRANKEN UND VERWUNDETEN IM FELDE.

BY S. H. STOUT, A. M., M. D., LL. D.,

Of Cisco, Texas.

After the battle of Chickamauga, whose field was, on an average, about eight miles from the nearest railroad station, the necessities of the service, in the absence of the requisite number of spring ambulances, compelled the appropriation of the empty transportation wagons (sent to the railway station for supplies), in the work of removing the wounded from the field.

On the battle-field and the region around it, were innumerable pine trees in every stage of growth. The empty commissary wagons were filled almost to their brim with pine tops and tender twigs of the pine bushes. Over this stratum were spread blankets, thus forming a soft, evenly and gently springing bed, upon which every class of wounded men were removed to the railway station, with less of suffering than when transported in ordinary spring ambulances.

To whom is due the credit of the suggestion of this method of utilizing the ordinary supply wagons, I do not know. It was proven to afford so much more of comfort to the sick and wounded, while in transit over ordinary roads, that, from the date of the above-mentioned battle to the end of the war, it was preferred to every other. In Georgia, the pine tops and twigs were used *ex necessitatè*, in the absence of straw, and because they were abundant and at hand. Straw, if at hand, would have been preferred.

Since the war, in civil practice, I have frequently removed patients (using the device above described), who were suffering from fractures of the lower extremities and debilitating disease, over long stretches of ordinary roads, with great satisfaction to them and myself, using wheat or oat straw, cured hay, or prairie-grass, in filling the wagon bed.

Spring wagons and other spring carriages, rebound so much in passing over even slight irregularities of the road surface, as to greatly torture many patients seated or lying down in them.

The simplicity of the above method of utilizing the ordinary transportation wagon, and its superiority over every other wheeled vehicle for the transportation of the sick

and wounded, commend it to every military surgeon whose experience in the field has impressed him with the fact that it is almost impossible to secure an adequate supply of spring ambulances after great battles.

Having had, during three years of the war, the direction of the transportion by rail of the sick and wounded of the Confederate Army of Tennessee, I, early in that service, became convinced that passenger railroad cars, fitted with berths one above another, did not answer the end aimed at, viz., the comfortable transportation of the sick and wounded, compelled to the recumbent posture while in transit from one place to another.

Cars, thus fitted with berths, could not be successfully ventilated. Patients upon the upper berths had to re-breathe the air expired by those occupying the lower berths. They were so far above the centre of gravity of the cars, that they oscillated and were jolted to a degree not compatible with comfort or safety. They were sometimes thrown from their berths while traveling over the then frequently rough tracks.

I dispensed with these so-called ambulance-cars, preferring to appropriate the baggage and common freight box cars for the transportation by rail, of patients whose condition enforced the recumbent posture.

Upon the floors of these cars were spread straw, from one to two feet deep. In the absence of straw, pine tops and twigs were used. Upon this stratum of soft material blankets were spread, thus making a comfortable bed for the patients.

Ventilation was secured by tearing or sawing out the planking of the sides of the cars, at the floor and just under the roof.

When hospital furniture as well as patients were to be removed, folded bunks and mattresses were first put aboard, and upon these the patients were laid.

In these cars, not far removed from their centre of gravity, the patients were not seriously jostled while passing over rough sections of the track.

During the last two years of the war the above methods of transporting the sick and wounded gave great satisfaction, and I did not regret the want of an adequate number of spring ambulances for field service; and I dispensed altogether with the so-called railway ambulance cars.

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# ON HOSPITAL AND OTHER HUTS, WITH DESIGNS FOR TROPICAL AND OTHER SERVICE.

## DES ABRIS SANITAIRES, AVEC DESSINS, POUR LE SERVICE AUX TROPIQUES ET AILLEURS.

## ÜBER HOSPITAL- UND SONSTIGE BARACKEN, NEBST PLÄNEN FÜR TROPISCHEN UND SONSTIGEN DIENST.

BY JEFFREY ALLEN MARSTON, M. D., M. R. C. P. ENG.,

Head of Sanitary and Statistical Branch of the War Office, London.

It would be rather interesting to trace the progressive steps of improvement that have taken place in the design and construction of Huts.

There is a sort of historical interest attached to the Hut occupied by the 79th Highlanders in the Crimea, for it illustrates two things—a bad form of hut in a bad position, and as a result, a considerable amount of disease among the men of that regiment.

Soudan. They are sufficiently cool, and although in this respect they are behind the mud huts, they possess perfect ventilation without draughts.

The following Table shows the temperature (F.) in straw-huts, mud-huts, and double fly hill tents, at Abri on July 1st, 1885.

| | STRAW HUTS. | MUD HUTS. | TENTS. |
|---|---|---|---|
| 8 A.M. | 84° | 86° | 82° |
| 12 M. | 98° | 96° | 108.5° |
| 4 P.M. | 102° | 99° | 111° |
| 6 " | 100° | 98° | 105° |

When the encampment of the troops at Suakim came under consideration, the question arose as to the most suitable description of hut for the purpose of protecting them against heat during the Summer.

Experience in India and Egypt led to the conclusion that the roof should be constructed of such material and thickness as to exclude the heat of the sun's rays; that the hut should be provided with verandas, and that it should be capable of the freest ventilation; in brief, that the troops should, as it were, live in the open air, under the

FIG. 3.

SECTION OF A HUT AS USED IN INDIA AND EGYPT.

shade of a thick cover, and that the nearer they could approach to the condition of a person provided with a large and thick umbrella, as a protection from the sun, the better.

The hut has been designed to accomplish this, as far as practicable. The roof of cork, covered with waterproof Willesden paper (Fig. 3), may be taken to represent the protective covering, and the metal cowls along its ridge the metal tip or ferrule of the umbrella; while, in respect of ventilation, with the body of air interposed between the roof and ceiling, the latter being made very pervious vertically, and the ward or barrack space beneath supplied with permeable walls of matting set in frames and removable at will (Fig. 4), an occupant of the hut may be practically said to live in the open air.

The bed of air above the ceiling communicates, at the ends and sides, with the outside air, and it is probable that the metal cowls, when heated, will produce, or at any rate aid in producing, a free upward movement of the air.

The walls of the outside veranda are to be provided, locally, with bamboo chicks or matting, to roll up at will (Fig. 4), so as to exclude the sun when down, or allow of any breeze passing into the inside of the hut when up. The boarded sides will protect

the beds from direct draught, and the lowest board along the sides of the hut is hinged and movable, so as to admit of the floor space being "flushed with air" when required. The doorways will be provided with chicks of permeable matting.

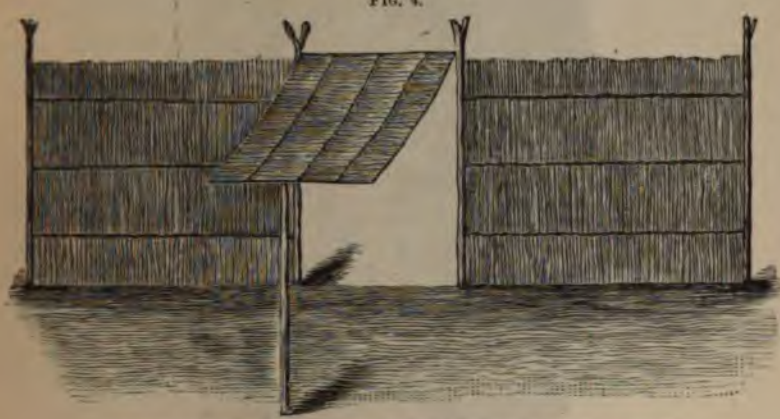
The huts are intended to be placed with the ends east and west and the sides north and south, so as to obtain the benefit of the prevailing wind.

The hut encampment at Suakim provides for officers, officers' mess, soldiers' and hospital huts.

The accompanying drawings, numbered 1, 2 and 3, are intended to illustrate the construction and general arrangement of the hospital huts; the other huts are similar in construction, differing only in a few minor details, according to requirements.

It will be seen, from the drawing, that the hospital huts are 47′, 4″ long by 21′, 4″ wide, and intended to accommodate 12 beds, giving a cubic space of 850 feet per bed; the floors are raised 18 inches above the level of the ground, to admit of a free circulation of air underneath. The timbers for the superstructure are secured to the ground sills and plates or roof, by means of stirrup irons, thus dispensing with mortice and tenon framing. (See Fig. 6, p. 71.)

FIG. 4.



SECTION OF MATTING ARRANGED TO OPEN AND SHUT FOR VENTILATION.

The sills on which the superstructure is fixed are placed on cross sleepers, and secured by means of elm stakes 4 feet long, driven into the ground. The sides and ends of the huts, for a height of 3 feet from the floor, are boarded, the bottom board being hung to open outward when required; above this height and up to the ceiling line the space is filled in by two rows of skeleton-framed shutters covered with Madagascar matting. These shutters are fitted with pulleys and lines, to enable them to be opened and closed from the inside of the huts.

There is a floored veranda on the north side of each hut, sufficiently wide to enable the invalids to be moved out in their beds, if necessary. (Fig. 5.) At the southeast corner are lavatories and earth closets, and at the southwest corner is the principal entrance to the hospital, with an orderly's room inside. The ceilings of the huts and verandas are of wood boarding, the roofs are formed by nailing boarding on the rafters, covered with cork slabs and waterproof Willesden paper. (Fig. 3.) Means of ventilation are provided between the ceilings and the roofs, extracting cowls being fixed in the latter.

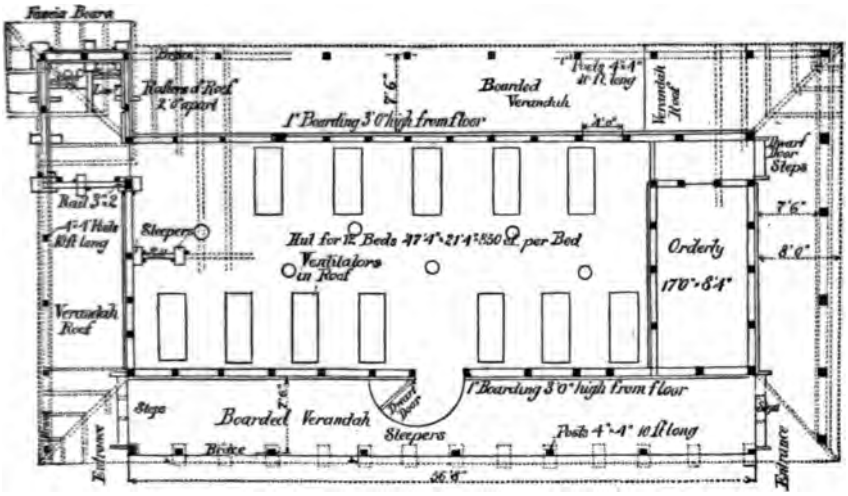
For this design may be claimed simplicity of construction, good arrangement, from a

Fig. 5.

medical point of view, and economy. The cost is about £130 or £140 ($650 or $700) per hut.

The latest hut designed to meet the requirements of both Winter and Summer, is that by Major Marsh, Royal Engineers. Its capacity is 5000 cubic feet, and weight 5 tons. It can be erected by six men in one day and taken down in three hours. 37½ pounds of coal per diem is found sufficient for warming, and if provided with a suitable stove, properly fixed, would not smoke. It is ventilated by hit-and-miss ventilators in sides and continuous ridge ventilation (slight). For severe climates inodorous felt might be introduced between painted canvas and boarding. Ventilation could be increased by opening windows in gables at each end. The hut should last thirty-three years, and its cost, including stove, is £150, or $750.

FIG. 6.




PLAN OF INTERIOR OF HOSPITAL.

THERMOMETRIC EXPERIMENTS IN HUTS AND BARRACK ROOMS.

HUTS.

| | 6 A. M. | 1.30 P. M. | 10 A. M. |
|---|---|---|---|
| Degrees warmer than in open air at the same time. ..... | 11⅔° | 13⅝° | 17⅝° |
| ..... | 5 ° | 8¼° | 18¾° |
| ..... | 4 ° | 5 ° | 17 ° |

BARRACK ROOMS.

| | 6 A. M. | 1.30 P. M. | 10 A. M. |
|---|---|---|---|
| Degrees above (+) or below (—) temp. in hut at same time. ..... | + 6 ° | — 5 ° | — ½° |
| ..... | + 7 ° | — 1⅔° | — 1½° |
| ..... | + 11° | + 9 ° | — |

During the first series of observations the fire in the hut was kindled at 5.30 A. M. and in the barrack room at 12.15 P. M. The other observations were taken under exactly similar observations.

These records all prove that wooden huts are much colder than permanent buildings in the early morning.

# ON THE CONSTRUCTION OF FIELD HOSPITALS, AS ILLUSTRATED IN THE DEPOT FIELD HOSPITAL OF THE ARMY OF THE POTOMAC, AT CITY POINT, VIRGINIA, IN 1864–65.

## DE LA CONSTRUCTION DES HÔPITAUX AMBULANTS D'APRÈS LE PLAN SUIVI A L'AMBULANCE GÉNÉRALE ATTACHÉE A L'ARMÉE DU POTOMAC À CITY POINT VIRGINIE, EN 1864-65.

## ÜBER DEN BAU VON FELDHOSPITÄLERN, NACH MUSTER DES DÉPÔT-FELDHOSPITALS DER ARMEE DES POTOMAC IN CITY POINT, VIRGINIEN, IM JAHRE 1864-65.

BY JAMES COLLINS, M. D.,

Philadelphia, Pa.

Formerly Brevet Lieut.-Col. and Brigade Surgeon of Volunteers, during the entire war of the Rebellion.

An apology, perhaps, is needed for inviting the attention of the Section to a subject so trite, and probably so well known to the majority of those present, as the subject of this paper; but the necessity of providing shelter under adverse circumstances was once so cogent, and the recollection of the scenes connected with it are so vivid, that I trust a brief allusion to the construction of Field Hospitals may not be looked upon as an intrusion on this occasion of the meeting of the Section of an International Medical Congress.

The dimensions of the regulation Army Hospital Tent, as issued in 1862, during the war of the Rebellion, were as follows: Length, fourteen feet. Width, fifteen feet. Height at centre, eleven feet, with wall or sides, four and a half feet, and a fly sufficient to cover the tent. Loops, or loop-holes were so constructed that two or more tents could be joined together, in which case they were held in position by means of ridge and tent poles, corresponding in height to the size of the tent. Ropes, tent-pins, with soil cloth and fly made of heavy duck, finished the appliance. The tents furnished to the Pennsylvania Reserve Corps were of superior quality, and regulation size. Through the patriotic efforts of our war Governor, A. G. Curtin, and the wisdom of the Surgeon-General of the State of Pennsylvania, Professor Henry H. Smith, they came without delay, thus giving the Regimental Surgeon an early opportunity of appreciating the value of the Hospital tent.

The pitching of the tent, and the space between the fly and the tent top were items of importance, as this tent formed the unit from which the field hospitals were chiefly constructed. When in position, with a space of one foot between the fly and the tent at the summit of the wall, the intervening air-space played no inconsiderable part in affording protection from either the sun's rays or rain. The necessity of carefully securing the tent pins was soon learned, as a hospital tent loosened to the winds was a sorry sight in camp; "a balloon hospital," as was said one day, when the tent had gone up.

During the summer months of 1861 the regimental hospitals were usually comfortable and cheerful spots, and one of the pleasant memories of the war, is the cordial interest shown by the commanding officers in selecting eligible locations for the hospital tents, which were to shelter the sick and unfortunate wounded of their respective commands. Regimental surgeons were not slow in appreciating the benefits which the good shelter of the tents afforded. These tents were *easily* ventilated, as in fair weather the sides could be raised and a good circulation obtained, while with the sides fastened down, the tent space was well protected from storms. Another advantage was found in the ease with which their location could be changed. Should the floor of the tent become noxious, from atmospheric odors, or long exposure to those accidents

incidental to the sick chamber, a new site was selected and the removal of both the tent and its contents quickly effected. Shading was often secured by forest trees adjacent to the tents, such positions being frequently available. In the absence of natural shade, attempts were made to secure it artificially by planting around the tents small pine trees which had been cut in the vicinity. These small trees, about four inches in diameter, were cut and placed upright around the tents, and were replaced by fresh ones when the first planting began to wither and become unsightly.

Drainage by a trench around the tent or tents was an indispensable precaution. These trenches were usually made about six inches wide and ten inches deep, thus securing perfect drainage, and, simple as this may seem, care was required. I remember, one rainy night, on the march from Drainsville, the trench, by accident, was so arranged that the lower portion of the declivity was highly banked up, and during the night, the rain falling in torrents, the bank gave way above, flooding the tent as the men were sleeping. "Sweet were their dreams, but their waking was a damp one."

After the army was stationed at Camp Pierpont, in 1861, the hospitals assumed a more permanent character; the tents were supported by a frame, and the floors covered with boards, and here the value of the tent hospitals became manifest. Malarial fever in its varied forms prevailed among the troops; also some typhoid and typho-malarial fever, as the distinguished and lamented J. J. Woodward, Asst. Surgeon U. S. A., was wont to designate the disease. Sanitary measures became imperative. Our "domiciles of canvas" were tested, and were found capable of affording protection surpassing the expectation of those who had hitherto been accustomed to use only permanent structures of brick and stone; in a word, "hospital practice."

The autumn passed and the fierce winds of winter flapped our doors, and forced upon us the question of heating. At Camp Pierpont, small stoves were used, which did very well when properly secured. These precautions involved cutting the tent and protecting the canvas by tin collars for the pipe. With attention, care and diligence, these answered, but small wood only could be used, and they required constant watching. But in tents heated in this manner, fevers, pneumonia, pleurisy and diarrhœa were well managed. Another device was the building of a rude fireplace (Fig. 1, p.74) in the ground, in front of the tent, the heat being conveyed to the back part of the tent by means of a covered trench there, communicating with a flue made of barrels set on end one above another (Fig. 2). In such cases the trench passing to the rear of the tent was covered with flat stone, old iron plates, or anything available, and on the whole, although not an artistic arrangement, it often did very well. Later, the ideas involved in the structure crystallized to form another and more perfect appliance (Fig. 3), as described on page 91, "Medical and Surgical History of the War of the Rebellion. Appendix, part I."

This device, Assistant Surgeon Calhoun described as an imitation of the camp stoves of the California miners, resembling in shape the ordinary reverberating furnace. The part for the fire was composed of clay, the chimney of twigs matted in and covered with clay. The top of the furnace was formed by inverting an old mess pan, and a piece of sheet iron was used for a diaphragm or damper, to regulate the draft and to economize fuel. This afforded ventilation, and for the most part furnished equable heat. The men were made comfortable on cots, with mattresses, each tent accommodating from six to eight patients. An improvement suggested by Medical Director Tripler, U. S. Army, consisted in the coupling of two tents by means of an extra fly, spread looped to each, thus making a pavilion between them, a convenient arrangement as well as an acceptable modification.

I have described the requirements of but a single regiment; what the needs of the whole army must have been can be estimated when we remember that Surgeon Tripler, the Medical Director of the Army of the Potomac, reports that in October and

November, 1861, in an army of 150,000 men, we had 7932 cases of fever of all sorts. About 1000 cases of typhoid fever were reported in the Army of the Potomac alone. From this experience the great requisites of hospitals were obtained; light, free circulation, sufficient heat, cleanliness, and minimum liability to the spread of disease by germs.

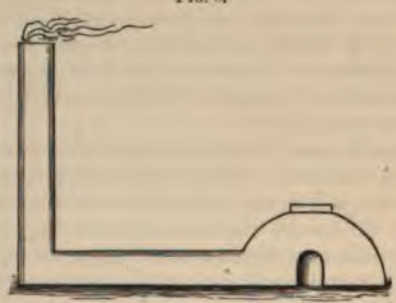
It must be remembered that during this period the Medical Staff of the Army of

Fig. 1.

Fig. 2.

the Potomac was acquiring a sanitary education in the matter of Field Hospitals. Under the direction of Medical Director Charles S. Tripler, the methods of the military surgeons of Europe were carefully studied, and medical officers taken from civil life were quickly instructed on the principles of hygiene and hospital requirements, and there they rapidly learned lessons which had never been hinted to them while students

Fig. 3.



and visitors of the great hospitals in the cities, either in our own country or abroad. On the banks of the Potomac, while the Union and Confederate forces were marshaled in hostile array, new glances into the needs of the sick and well were obtained by medical officers, whose professional zeal was kindled anew by the fire of patriotism.

From the Regimental Hospitals there was developed a system of Brigade and Division Hospitals, and as the necessity for creating a "Hospital Fund" came to be

better understood, the facilities were much increased, better food, and even delicacies, being furnished to the soldiers.

The hospital under tents in winter gave satisfactory shelter. At Fredericksburg, the wounded were gathered into tents, and here an abundance of straw served to protect them, although the weather was cold and the ground frozen, but these men were soon transferred to Northern hospitals for better care. When straw was not available, boughs of pine trees were utilized, making the quarters quite comfortable.

At Antietam, September, 1862, the farm houses, barns and out-buildings were first used as shelter for the wounded, but the establishment of the general hospitals at Smoke Town, constructed with tents, soon furnished accommodations for all the sick and wounded. Better ventilation seemed to be a recommendation for the tents, and their advantages were soon demonstrated by the disappearance of gangrene, erysipelas, etc.

The Army of the Potomac was in good condition when it crossed the Rapidan, May 3d and 4th, 1864. The medical officers who performed duty were witnesses to stirring events while the armies were fighting in the dense wilderness, sometimes the contestants neither seeing nor being seen by those of the opposite side.

After the distribution of the artillery reserves, of which I was in charge, I reported to Surgeon E. B. Dalton, U. S. Volunteers, at Fredericksburg, Va., who there organized a series of Depot Field Hospitals. Although the buildings were commodious, well arranged, and the supply of water good, overcrowding was unavoidable. Soon erysipelas and hospital gangrene in mild form were noticed, but the distribution of these cases to tents quickly checked the disease. This spirited campaign soon brought the hospitals to the White House, together with tents, ambulance corps and other paraphernalia, and as rapidly as possible this place was vacated, and as early as May 28th, a new base had been selected at White House. Tents were pitched and shelter given, but this being only a temporary location, every available steamer was converted into a hospital transport, and the sick and wounded hastened forward to safer and more desirable quarters.

June 15th, 1864, orders were received to proceed to City Point, Va., and there establish field hospitals. Medical Director Thomas McParlin states (page 165, Appendix, Vol. I, "Med. and Surg. Hist. War of Rebellion"), that the only site available for a hospital camp was the south bank of the Appomattox, about three-quarters of a mile from City Point. The ground selected was about thirty-five feet above the water level, and an open country, and here commenced the organization of the vast hospital, even when the battle was raging.

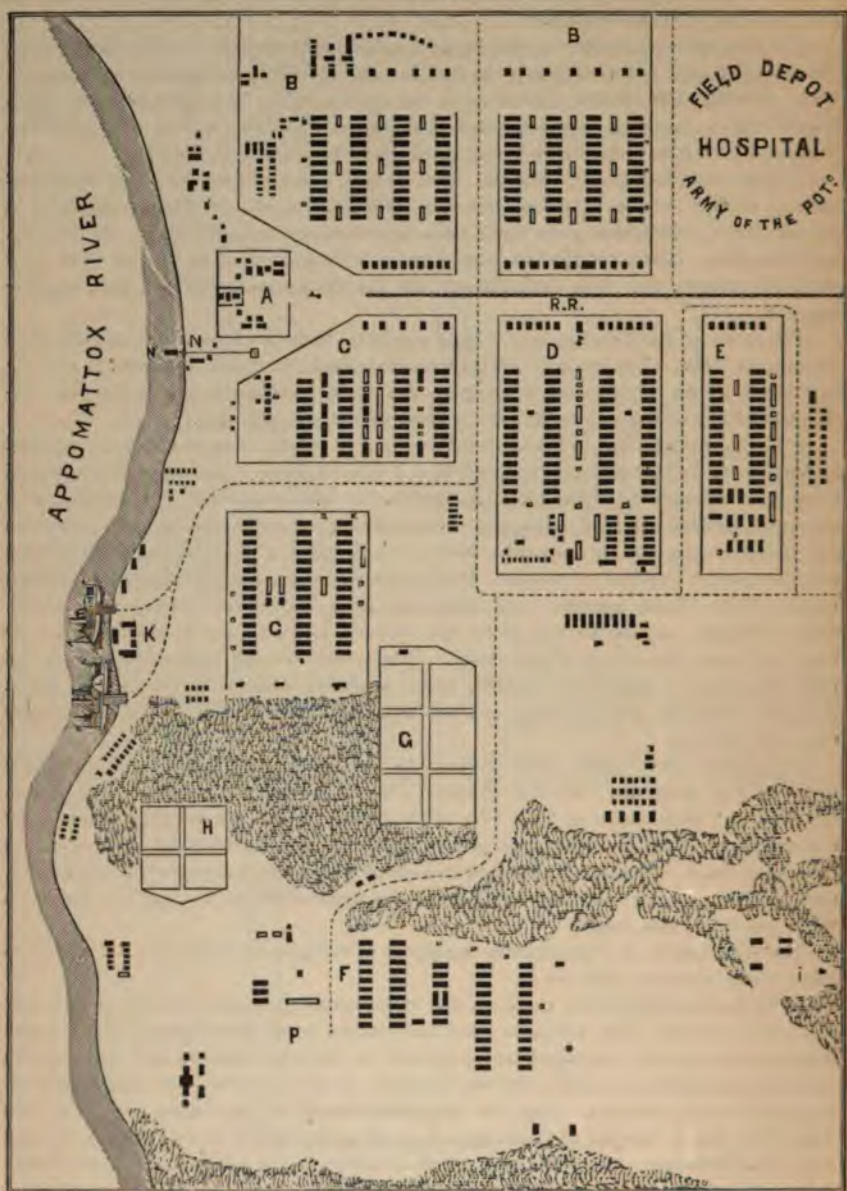
The following is an abstract from the report of Surgeon E. B. Dalton, U. S. Volunteers, made in June, 1864:*—

"We finally reached City Point on the 18th instant, just as a train of ambulances had arrived loaded with wounded from the assault upon Petersburg. The hospital property was at once unloaded and conveyed to the site selected, and there put in readiness as rapidly as possible for the reception of the wounded, who still continued to come in large numbers. This site was located south of the James river, one mile from City Point, toward Petersburg. It is situated upon a broad plain extending from the Petersburg pike to the high bluffs overlooking the banks of the Appomattox, just at the junction of the latter with the James river.

"The plan of encampment (Fig. 4), which still remains essentially unaltered, was mainly devised by Dr. Phelps. Some irregularities occurred in the execution, in consequence of the embarrassment of laying out the camp and erecting tents at the same

* "Medical and Surgical History of the War of the Rebellion." Part 1. Vol. I. Medical History, page 193.

FIG. 4.




GROUND PLAN OF THE DEPOT HOSPITAL AT CITY POINT.

A. Office of Medical Officer and Staff.
BB. Section for Second Corps, Army of Potomac.
CC. Section for Ninth Corps, Army of Potomac.
D. Section for Fifth Corps, Army of Potomac.
E. Section for Sixth Corps, Army of Potomac. (Subsequently U. S. Colored troops.)
F. Section of Cavalry Corps.
GH. Cemetery.
I. Office of Medical Officers, Cavalry Corps.
K. Medical Stores.
L. Wharf and Steamer of Medical Purveyor.
N. Water Tank.
□ Latrines.
▭ All these spaces indicate Diet Kitchens.
RR. Railroad.

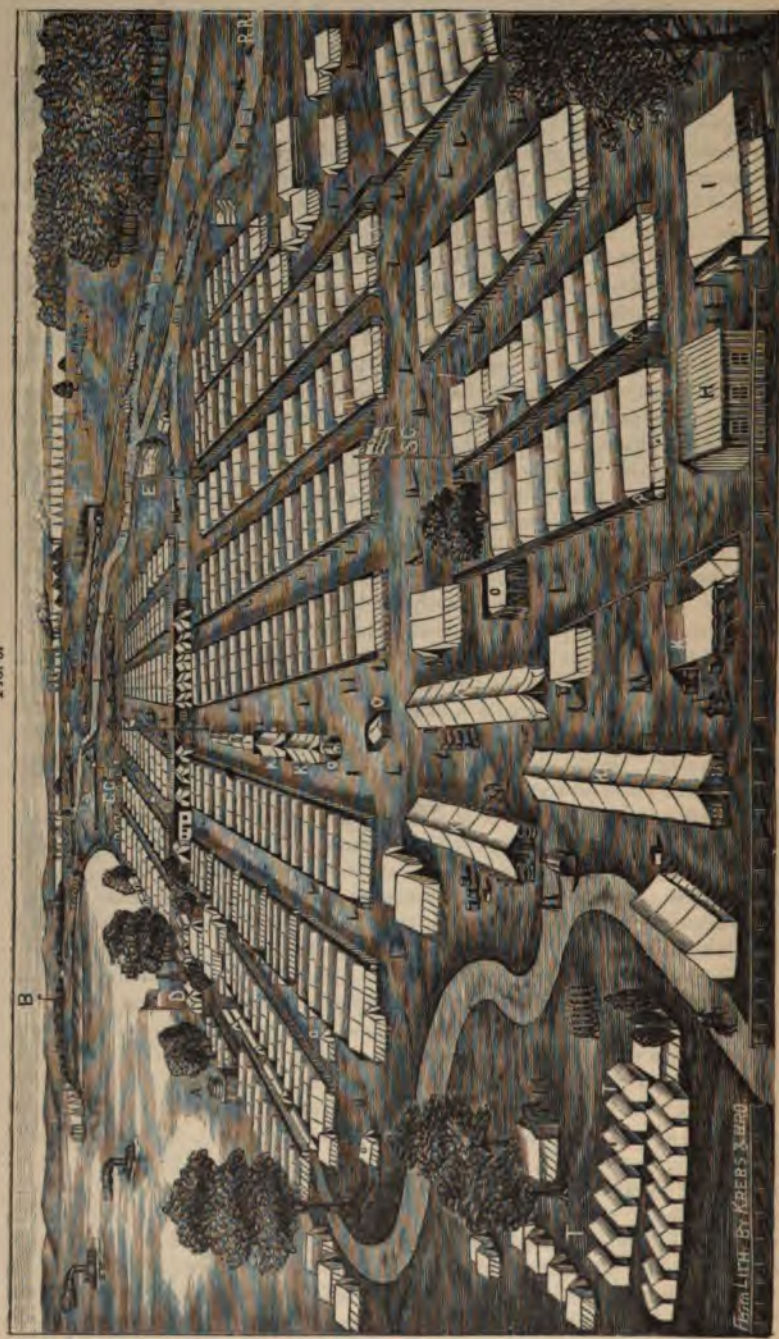
time that the presence of wounded called constantly for professional labors. By means of pontoons, temporary wharves were soon constructed at a convenient point, a short distance up the Appomattox. These were for the exclusive use of the hospital, and were used for landing and issuing supplies, and for transferring wounded to the hospital transports. The services of the transports were immediately, and for a time constantly, in demand.

"The medical purveyors met all necessary demands with promptness and liberality. Nothing essential to the care of the wounded was wanting. Bed sacks and blankets were supplied without stint, and arranged upon the ground beneath the tents. None were without shelter. Drugs and dressings were in abundance. Hospital stores, ice, and even delicacies, were constantly issued. Cooking stoves, cauldrons and portable ovens were on hand in sufficient quantity for any emergency. Requisitions received prompt and full attention at all times. But a short time elapsed before the arrival of an abundant supply of bedsteads, when sheets and pillow-cases were at once made use of in all cases where they could essentially add to the comfort of the patient. The capacity of the hospital was rapidly increased, until it became capable of accommodating ten thousand patients. At first, these were mainly wounded, but as the season advanced, and the prolonged duty in the trenches told upon the men, the proportion of sick became greater. Each successive engagement would fill the beds with wounded, but these, especially the severely injured, were sent north as rapidly as possible, while the sick, as a general rule, were removed only when the character of the case rendered a change of climate essential to recovery. *The entire encampment* now covered an area of some two hundred acres, and comprised no less than twelve hundred hospital tents. (Fig. 5, p. 78.) These latter were originally pitched in groups composed of two tents with an intervening fly, and placed end to end. These groups were arranged in rows side by side, divided by lateral interspaces of fifteen feet in width between the individual groups. The ends of the groups fronted streets *sixty* feet wide, running parallel with the river, and meeting at right angles a main avenue one hundred and eighty feet in width, which extended through the centre of the camp from the verge of the bluff to the Petersburg pike. On the approach of cold weather an entire tent was substituted for the intervening fly in each group. (Fig. 5.)

"Shortly after the establishment of the hospital at this point, works were constructed by the quartermaster for supplying the encampment with water. Two steam engines, of four horse-power each, were placed at the foot of the bluff, at the edge of the river, whence they forced water into a tank capable of containing six thousand gallons. The tank was raised thirty feet above the level of the bluff, and supported upon a strong trestlework. From this tank a conducting pipe two inches in diameter descends to the ground and is conducted eighteen inches below the surface, along the main avenue. At right angles to this main pipe smaller ones diverge at intervals, and enter the various divisions of the hospital, where at the extremity of each pipe is a hydrant. These works, which were completed on the 6th of July, proved entirely satisfactory, and an abundance of river water was thus supplied for laundry, bathing, and other purposes. Wells were dug in various parts of the hospital grounds, and these, with numerous springs in the vicinity, afforded a plentiful supply for drinking and cooking.

"For several weeks subsequently to the arrival at City Point no rain fell, and the accumulation of dust became a source of great discomfort. Bodies of troops and wagon trains were constantly passing along the main road, and the dust was borne in dense clouds over the camp, filling the tents and penetrating the bed clothes. This matter was represented at the Surgeon-General's office, and sprinkling carts applied for. Eight of these were promptly sent down from Washington, and were constantly made use of. They afforded great relief, not only in subduing dust, but also in mod-

FIG. 5.


A. Water Tank.
B. General Grant's Headquarters.
C. C. Christian Commission.
D. Office of Chief of Medical Staff.
E. Hospital for Colored Troops.
F. Railroad to Supplies.
G. Dead House.
H. Tool House.
I. Carpenter Shop.
K. Diet Kitchens.
L. Tents for Troops.
O. Latrines.
R. Arbors.
R. R. Road to Hospital.
S. C. Sanitary Commission.

erating the intense heat of the atmosphere. To furnish some shade, broad bowers were built continuously along the ends of the tents on each side of the streets.

"For purposes of drainage, each group of tents was surrounded by a trench, and from these trenches the water was conducted into ditches which ran along each side of the streets, and terminated in still larger ones in the various ravines with which the ground is broken up, and which descends rapidly to the river. This system of drainage has proved entirely effectual.

"It is impossible, by merely quoting the register, to convey an accurate idea of the number of sick and wounded who at this period received attention. At Fredericksburg, at White House, and still later at City Point, hundreds passed through under circumstances which rendered it impracticable to register their names, or even to estimate their number accurately. This always occurred during or immediately subsequent to an engagement, when the accumulation of wounded and constant calls for professional labor sometimes made it necessary to transfer at once from the ambulance to the hospital transports. In fact, as I have already stated, so unremitting were the professional duties of the medical officers during the first fortnight at Fredericksburg, that it was impossible even to prepare morning reports, and it was not until the 16th of May that a daily numerical report was attempted. From that date daily reports were forwarded, and they show that from the 16th of May to October 31st, there were received into this hospital and retained under treatment for at least forty-eight hours, 68,540 sick and wounded officers and men. Of these, 51,313 were transferred to the various general hospitals at the North, and 11,706 had been returned to duty with their commands. 1516 died. A large number of the wounded had sustained amputations or other capital operations at the immediate front, before coming to this hospital; but in many other cases similar interference was still necessary. The experience here gave the most convincing evidence in favor of primary operations in gunshot wounds. The majority of the sick received during the summer suffered from dysentery, diarrhœa and malarial fevers. A small proportion of cases of typhoid fever occurred, and a very few comparatively of pneumonia and other diseases of the chest.

"The manifestations of malarial influences were, as a general rule, of a mild character, and evidently owing, in a great measure, to the prolonged exposure and hard service to which the men were subjected in the trenches. In fact, very many of them do not properly come under the head of either of the recognized classes of malarious fevers, but were rather cases of a depressed condition, not inaptly expressed by the term malarial-malaise. A large portion of these patients recovered rapidly and entirely under the influence of rest, cleanliness and good nourishment, together with a moderate administration of quinine and iron. A number of cases of disease occurred within the limits of the encampment, but not in sufficient number or of sufficient severity to impair the efficiency of the hospital, or to throw any doubt upon the propriety of its continuance. On the contrary, the number who recovered and returned to duty within a few weeks after their admission, and without their removal to a distance from the seat of war, proved this site a most eligible one. A few cases of hospital gangrene were noted in August. Separation from other cases, bromine and good feeding arrested this."

The medical officers serving at the Depot Field Hospital of the Army of the Potomac numbered eighty. They were distributed under the orders of Surgeon E. B. Dalton, U. S. Volunteers, to the respective corps, and distinct duties. The number of wounded was so great that no morning report could be kept until June 20th, 1864. From May 21st, 1865, the register shows there were 44,951 sick; 25,805 wounded soldiers received; 467 sick and wounded officers, making a total of 71,223 cared for. Of these, 467 returned to duty; from furlough and desertion 23,760 were returned to duty. Sent north to general hospitals, 42,034; sent to corps and field hospitals,

162; furloughed, 1297. Discharged on surgeon's certificate, 13; discharged on expiration of service, 2. Total number of deaths, 1622.

The transportation of the sick and wounded was accomplished by means of ambulances and an ambulance corps, railroads to the hospitals at the North, and, as stated, the steamers which were officered and organized as hospital transports, conveyed the wounded elsewhere.

The Appomattox being a small river as compared with the James, the tides were necessarily watched. The evasive character of the stream is well illustrated by an incident which occured in March, 1865. The clergyman of the Christian Commission had appointed the time for baptism at flood-tide; the prayer of the good man was long and eloquent, but lo! when he had finished, the water had receded, and the stream was gliding gently on in its course fifty yards away. The baptism was postponed.

The sanitary condition was maintained by constant attention. Latrines were dug about eight feet deep, and covered with tent flies, or surrounded by arbors. Daily, earth was thrown into them, and as soon as they were nearly full a new trench was dug, and sulphate of iron was freely used as a disinfectant.

A sketch of the hospital would be incomplete without mention of the faithful and generous work of the Christian Commission, which supplemented by supplies and good works the efforts of the medical officers. And who can tell how much comfort was given to the sick and suffering, by the gentle, earnest women who sought to assuage the suffering, and oft, when the end was near, pointed with gentle words the weary soul through the dark valley of death. And then again, there must not be forgotten a tribute to the noble band of women who rendered efficient aid, in presiding over the special diet kitchen, thus rendering the advantage derived from the "hospital fund" available in the form of well prepared delicacies, to the rugged and sunburnt soldiers disabled by disease or wounds.

Much of the labor incident to hospital wants was performed by contrabands, authority having been given by the Surgeon-General of the U. S. Army to employ them. They came in squads, arrayed in styles novel and surprising. One little boy appeared, black as a coal, with a scant shirt and an enormous white hat; women in silks with insufficient waists and corded behind with a string, barefooted and with gay parasols, were frequently seen. They were free; what more was needed? Their zeal for labor, however, was not intense. I remember having a group put to work to repair the road at a point shown on the chart; later in the morning I passed them, and noticing that but little had been accomplished, I expressed my feelings in language more vigorous than elegant. A venerable colored man, with gray hair and pious face, raised his hands in holy horror and exclaimed: "Oh, Massa Doctor, you must not swar; we'uns is just puttin' in de time."

This rapid sketch of the great Depot Field Hospital is simply offered as a contribution to the history of the campaign against Richmond under General Grant. It is a brief reminiscence of scenes and medical practice; mainly proving the benefits derivable from hospital tents, in the care of the sick and wounded, as compared with house-like structures, and showing that the principles of sanitation can be carried out in the field, and that Tents are competent to secure all that is needed, namely, shelter, cleanliness, heat, air and drainage, as well as freedom from poisonous germs.

# DIE MODERNEN FORDERUNGEN AN STABILE UND MOBILE KRIEGS-HEILANSTALTEN.

## ON THE MODERN DEMANDS FOR STATIONARY AND MOVABLE HOSPITALS IN WAR.

## SUR LES DEMANDES MODERNES POUR LES STATIONAIRES ET MOUVABLES HÔPITAUX DANS LA GUERRE.

VON DR. NEUDÖRFER,

Wien.

MEINE HERREN!—In den letzten Sitzungen haben Sie sich ausschliesslich mit rein-chirurgischen Fragen beschäftigt; heute soll es unsere Aufgabe sein, Fragen der Discussion zu unterwerfen, die nicht ausschliesslich die Chirurgie, sondern auch in gleicher Weise die Militär-Medicin interessiren.

Die Geschichte aller bisher bekannt gewordenen Kriege lehrt, dass, unabhängig von der Dauer und Intensität der Kriege, gleichviel ob dieselben eine grössere oder kleinere Anzahl von Schlachten (in der Zeiteinheit) aufzuweisen haben; ob die Schlachten nach Stunden oder nach Tage langer Dauer zur Entscheidung geführt haben; ob dieselben mit Tapferkeit, Ausdauer und Erbitterung als Offensiv-Kriege oder nur als Defensiv-Kriege mit wenig Ausdauer, Nachgiebigkeit und stetem Aus- und Zurückweichen geführt worden sind; in allen Fällen war die Zahl der Soldaten, die durch feindliche Waffen getroffen dienstuntauglich geworden und ihre Gesundheit und Leben eingebüsst haben, viel kleiner als jene, die durch Krankheit Invalid geworden und gestorben sind. Wir abstrahiren hierbei von jenen Schwächlingen, die den Anstrengungen des Krieges nicht gewachsen waren, die also nicht eingereiht hätten werden sollen. Auch die Gesunden, Kräftigen und Diensttauglichen liefern ein sehr namhaftes Procent an Krankheits- und Sterbefällen. Die unabänderlichen Verhältnisse des Kriegs erzeugen eine Reihe von Krankheits-Ursachen, denen die Kräftigen, wie die Schwächlinge erliegen. Untersuchen wir diese krankmachenden Agentien, so finden wir in erster Linie die uncontrolirbaren atmosphärischen Einflüsse; grosse Hitze während des Tages, niedrige Temperatur in den Morgen-, Abend- und Nachtstunden, rauhe Nord- und Ostwinde, Staub und lang andauernder Regen sind Schädlichkeiten, die jede für sich, ganz besonders aber, wenn mehrere derselben zusammen wirken, den Soldaten in relativ kurzer Zeit krank machen können. Dann kommen die Bodenverhältnisse in Betracht. Der Soldat kann sich sein Marsch-, Lager- und Schlacht-Terrain nicht wählen. Er muss zuweilen auf feuchtem, sumpfigem, infizirtem und siechmachendem Boden marschiren, ruhen und lagern und dabei den Krankheitskeim acquiriren.

Eine weitere Ursache der Erkrankung im Kriege ist in der qualitativ und quantitativ nicht immer entsprechenden Ernährung des Soldaten zu suchen. Bei aller Fürsorge der Heeresleitung werden doch in der Zufuhr und Vertheilung der Nahrungsmittel Stockungen und Störungen nicht zu vermeiden sein; sehr oft wird der Soldat für längere Zeit auf die Surrogate der gewöhnten Nahrungsmittel, auf Zwieback und auf die verschiedenen Conserven angewiesen sein, und selbst bei regelmässiger Verpflegung lässt die Qualität und die Zubereitung der Nahrungsmittel viel zu wünschen übrig; ganz besonders ist es der Mangel an Abwechselung und die Einförmigkeit der Nahrungsmittel, welche die Verdauung stören, die Ernährung und die Gesundheit des Soldaten herabsetzen und gefährden. Noch häufiger als die Verpflegung ist das Trinkwasser die Ursache von Krankheiten. Der Soldat ist nicht immer in der Lage, seinen Durst mit reinem Quellwasser zu stillen, er muss sich oft mit Brunnen-, Fluss- und anderem Wasser begnügen, welches durch Auslaugung eines verunrei-

nigten Bodens, oder durch andere von aussen in das Wasser gelangte Schädlichkeiten ungesund und infektiös geworden ist. Nun kommen die aufreibenden physischen Anstrengungen. Der Kriegszweck nöthigt den Soldaten, mit seiner ganzen Rüstung beladen bis 50 Kilometer im Tage zu machen, und er kann nach diesem erschöpfenden Marsche nicht immer der Ruhe pflegen, noch den grossen Stoffverbrauch durch entsprechende Nahrung ersetzen. Die grossen Aufregungen, denen der Soldat ausgesetzt ist, die Trennung von und die Sorge um die Seinen, die vielen Alarmirungen, der ergreifende Anblick von schweren und tödtlichen Wunden in seiner unmittelbaren Nähe, die Sorge für das eigene Ich, der Gedanke, in dem nächsten Augenblick verstümmelt oder getödtet zu werden, u. s. w., wirken auf die Nerven des robusten Mannes aufreibend und krankmachend. Die Unmöglichkeit, im Felde die Haut zu pflegen, beeinträchtigt die zur Gesundheit nöthige Hautrespiration, die zur Ausscheidung durch die Haut bestimmten flüssigen und gasförmigen Substanzen können krankmachend wirken. Endlich ist das Zusammengedrängtsein so vieler Tausend Menschen auf einen relativ kleinen Raum schon an und für sich eine allseitig anerkannte Ursache von Krankheiten und Epidemien.

Aus dem Gesagten geht hervor, dass in jedem Kriege Krankheiten der verschiedenen Organe, der Athmungs-, der Verdauungs-, der Zirculations-, der sekretorischen, der Bewegungs- und der Nerven-Organe auftreten werden, die temporär oder dauernd unterzubringen, für die also Spitäler zu errichten sind. Man kann die Zahl dieser im Kriege erkrankten Soldaten mit 10 pCt. der Ist-Stärke berechnen, wobei auf die Zahl der durch die feindlichen Waffen Verwundeten keine Rücksicht genommen ist. Die Unterbringung, Verpflegung und Behandlung einer so grossen Zahl von Kranken in den Kriegsspitälern bildet eine grosse Verlegenheit für die Heeresleitung und einen Nachtheil für die Kranken. Im Interesse Beider ist es gelegen, einen grossen Theil der Kranken weit zurück hinter den Kriegsschauplatz zu evakuiren. Die Auswahl der in den Kriegsspitälern zu behandelnden und der zurück zu sendenden Kranken ist nicht so leicht als man vermuthen sollte. Ihre Aufgabe wird es sein, durch die Discussion die Principien festzustellen, nach welchen die Kranken in Kategorien einzutheilen sind, in solche, die in einem Kriegsspital aufgenommen werden müssen, in solche, die zurückgesendet werden müssen, also nicht aufgenommen werden dürfen, und endlich in solche, deren Aufnahme eine bedingte, d. h. nur unter gewissen Verhältnissen statthaft ist. Bei der Lösung dieser Frage werden Sie bei Kranken, so wie Sie es früher bei Verwundeten gethan haben, den Begriff "*intransportabel*" nach wissenschaftlichen Principien und bestimmten Indikationen festzustellen haben.

Ehe ich auf meinen Gegenstand selbst übergehe, möchte ich erwähnen, dass die die Chirurgie beherrschende Frage der Antisepsis eine andere sehr wichtige Frage der Militair-Medicin in den Hintergrund gedrückt und beinahe in Vergessenheit gebracht hat, die bei ihrer hohen Bedeutung eine nähere Besprechung erheischt. — Scharf beobachtende Chirurgen haben bemerkt, dass auch in ganz neuen, allen Forderungen der Wissenschaft und Humanität entsprechenden Spitälern die in denselben behandelten Verwundeten von *Erisipel*, progredienter Pflegmone, von *Pyamie*, und *Septicaemie* und *Nosocomial Gangrän* befallen werden, während ganz alte, auf siechem Boden stehende überlegte Hospitäler, wenn die in denselben liegenden Verwundeten streng antiseptisch behandelt werden, von den genannten *accidentellen* Wundkrankheiten verschont bleiben und es gestatten, grosse und eingreifende Operationen unter einem *afebrilen* Verlauf zu einem gedeihlichen Ausgang zu bringen. Durch die Antisepsis ist daher die früher von Simpson und Pirogoff aufgeworfene Frage des "Hospitalismus" verdrängt worden. Unter diesem Namen haben die genannten Autoren die Schädlichkeiten und Gefahren zusammengefasst, die einem Kranken oder Verwundeten erwachsen, aus seinem Aufenthalte in einem Spitale,

welches in volkreichen Städten gelegen, oder welches Jahre lang von gesunden oder kranken Menschen bewohnt war. Simpson stellt daher die Forderung, die permanenten Spitäler in den grossen Städten ganz aufzuheben, dafür sogenannte Cottage-Hospitäler zu errichten und diese nur temporär zu benützen. Wenn auch Simpson unmögliche Forderungen stellt, so scheint denn doch die Frage berechtigt: Ist gestattet, eine durch Jahre hindurch zum Truppenbelag benutzte Kaserne in Kriegszeiten zu einem Spital zu adoptiren, wie dieses in vielen europäischen Staaten organisationsmässig geschieht? Mit anderen Worten, lassen sich die durch Jahre langes Bewohnen der Kasernen von zahlreichen Soldaten entstandenen Schädlichkeiten durch Desinfektion beseitigen und unschädlich machen?

Andererseits bleibt die Benützung der als Kriegs-Spital benützten Kaserne, Schule und Kirche nach Auflösung und Desinfektion des Spitals ohne nachtheilige Folgen für die Soldaten, Schüler und Gemeinden, welche diese Baulichkeiten ihrer früheren Widmung gemäss benützen? Mit anderen Worten, lassen sich infizirte Mauern durch die gewöhnliche Methode der Desinfektion mit Sicherheit desinfiziren? Nach den gegenwärtig herrschenden bakteriologischen Anschauungen werden alle ernsten Erkrankungen durch Mikroben erzeugt, von denen manche sich durch *ultramikroskopische* Sporen vermehren und fortpflanzen. Diese kleinen Sporen sind Dauersporen, können, mit der Luft bewegt, nicht gesehen werden. Nun ist durch Pettenkofer nachgewiesen worden, dass unsere Mauern, wenn dieselben nicht durch umständliche und kostspielige Prozeduren impermeabel gemacht werden, für Luft und Gase durchgängig sind. Es werden daher mit der Luft die in derselben schwebenden Keime und Sporen die Mauern passiren und werden gelegentlich daselbst liegen bleiben. Wenn eine solche Mauer frisch verputzt und getüncht wird, so bleibt sie dennoch siechhaft und kann gelegentlich disponible Personen infiziren. Wenn diese Anschauung für richtig gehalten wird, dann erhält der "Hospitalismus" eine viel höhere Bedeutung, als Simpson demselben zugeschrieben hat; dann dürften Kasernen, Schulen, Kirchen, öffentliche Versammlungs- und Belustigungsorte nicht zur Adoptirung für Kriegsspitäler herangezogen werden, weil die Mauern schwer zu desinfiziren sind und die nachträglichen Benützer dieser Räume, falls sie für die Infektionskrankheiten disponirt sind, erkranken können. Es bleiben daher für Kriegs-Spitalzwecke nur die in den Gärten und Parken stehenden, selten bewohnten Villen und Schlösser, luftige Magazine, Hallen und Speicher etc. übrig, oder es müsste eine mehr verlässliche Methode der Desinfektion der Mauern angewendet werden, welche die etwa in den Mauern befindlichen pathogenen Keime zu vernichten und unschädlich zu machen vermag. Nachdem diese Villen etc. für die Deckung des Bedarfes an Krankenbetten nicht ausreichen, so bleibt nur die Errichtung neuer Spitäler übrig, die wahre Cottage-Hospitäler sein werden, wie es Simpson fordert. Es sind dies einzelne isolirte Blocks, die nach Beschaffenheit des Terrains, der Windrichtung, des Wasserfalles gruppirt und geordnet, zu Barackenspitälern in Holz-Konstruktion aufgeführt werden. Ueber den Bau der Baracken ist Alles bestimmt; Luftquantum, Bodenfläche und Höhe, Grösse der beleuchteten Fläche und der Ventilation; dagegen ist mit Rücksicht auf die Desinfektionsfrage ein bedeutender Umschwung in den Anschauungen eingetreten. Früher hat man sich damit begnügt, in die Kanäle und Aborte Eisenvitriol oder Karbolsäure zu schütten, und nur bei akuten Exanthemen, bei Cholera und Flecktyphus hat man auch die Kleider, Wäsche und das Bettzeug desinfizirt; bei allen anderen Krankheiten glaubte man genug gethan zu haben, wenn man für die neuen Beleger eines Krankenbettes frische Bettwäsche aufgebreitet hat. Nach unseren heutigen Anschauungen müsste man anders vorgehen. Man nimmt an, dass alle Blut- und adynamischen Krankheiten durch Invasion eines Mikroben hervorgebracht seien. Bei vielen Krankheiten ist die Natur des infizirenden Bakterium genau bekannt, aber auch bei jenen Krankheiten, bei denen der Mikrobe noch nicht gekannt und botanisch bestimmt ist,

lässt man denselben doch als Ursache der Krankheit gelten. Mit dieser Ansicht aber sind alle Krankheiten zu Infektionskrankheiten gestempelt und erheischen so wie nach akuten Exanthemen, Cholera etc., eine gründliche Desinfektion der Kleider, Wäsche, des Bettzeuges, der Matratzen, Polster, Decken und der Utensilien, des Bodens und der Wände, ja man müsste bei einem und demselben Kranken, um die Autoinfektion zu verhüten, dem Kranken täglich frische Wäsche und Bettzeug geben und ihn selbst desinfiziren. Wollte man dieses bei jedem Kranken als Regel gelten lassen, so würde damit eine Krankenbehandlung im Spitale geradezu unmöglich gemacht werden. Zum Glücke ist eine Reihe von Krankheiten bekannt, die zwar durch Bakterien hervorgerufen werden, die aber dennoch keine Infektions-Krankheiten sind. Ich nenne die Gruppe der Malaria-Krankheiten, für welche Thomasi Crudelli, Klebs Marchsafava den causalen Mikroben entdeckt und nachgewiesen haben; dennoch ist die Malaria an die Lokalität des siechhaften Bodens gebunden und kann nicht auf eine andere Lokalität und auch nicht von Menschen auf Menschen übertragen werden. Die Malaria ist daher keine Infektionskrankheit, die es erheischen würde, nach jedem Kranken alle Bettbestandtheile zu desinfiziren. Dagegen sind die Tuberculose und der *Typhus abdominalis*, der Scorbut, erwiesener Maassen Infektions-Krankheiten, die so wie die akuten Exantheme nach jedem Kranken eine gründliche Desinfektion erheischen. Ob die Pneumonie, die Pleuritis, die Peritonitis, der Rheumatismus als Infektions-Krankheiten aufzufassen und zu behandeln sind, ist zur Stunde noch nicht bestimmt. Ihre Aufgabe würde es daher sein, in einer Resolution es auszusprechen: *Es empfiehlt sich, alle durch Bakterien erzeugte Krankheiten in zwei Gruppen einzutheilen, in die Gruppe der infektiösen Blutkrankheiten, die Tuberculose, der Darmtyphus, die Meningitis, das Erysipel, der Scorbut etc., die so wie die akuten Exantheme einer Desinfektion bedürfen, und in die Gruppe der Malaria, die Febris intermittens, Febris recurrens etc., bei denen die einfache Reinlichkeit genügt und keine Desinfektion erheischt wird.* Mit Rücksicht auf die erstgenannte Gruppe wird später angegeben werden, welche Aenderungen in der Einrichtung eines Spitals nöthig sind, um die Uebertragung von Tuberculose etc. durch den Spitalsbelag hintanzuhalten. Die Entscheidung der Frage über die beste Methode der Desinfektion wollen wir der XIV. Sektion für Hygiëne überlassen. Bisher hatte man die Kriegs-Spitäler eingetheilt: *a*) In bleibende; es sind dieses alte Baulichkeiten aus Stein, die entweder als Spitäler oder zu anderen Zwecken fortbestehen sollen. *b*) In neu *ad hoc* errichtete und nach Beendigung des Krieges wieder aufzulassende Baulichkeiten; es sind dieses die aus Holz errichteten Baracken-Spitäler. *c*) In Transport-Spitäler, die den Zweck haben, die Kranken von einem Ort auf einen andern zu überführen, und zum Aufenthalte der Kranken nur für wenige Tage bestimmt sind. Es sind dieses die Eisenbahn-Sanitätszüge, die Schiffs-Ambulanzen und die gewöhnlichen Ambulanzen, die aus Kranken-Transportwagen bestehen. Vor einigen Jahren wurde die Frage erörtert, transportirbare Spitäler zu construiren. Es sind dieses zerlegbare Spitäler, die transportirt werden können, um auf einem beliebigen Ort zusammengesetzt und belegt zu werden. In der Ausstellung in Antwerpen im Jahre 1885 waren mehrere Systeme von transportablen Krankenzelten ausgestellt; einige derselben sind auch prämiirt worden. Ob aus den transportablen Zelten dereinst transportable Spitäler hervorgehen werden, wird die Zukunft lehren. Ich möchte bei dieser Gelegenheit Ihnen einen hierher gehörigen Vorschlag zur Prüfung unterbreiten. Dieser Vorschlag geht dahin, ob es sich nicht empfehlen würde, dort, wo grosse Wasserflächen in der Gestalt von Strömen oder Seen oder Meeren zur Verfügung stehen, diese zu benützen, um auf denselben mobile Spitäler in Form von Wasser-Baracken zu errichten. Es wäre auf einem flossartig gezimmerten Unterbau eine normale Kranken-Baracke für 100, 150 oder 200 Kranke zu errichten. Mehrere solcher Floss-Baracken könnten zusammengekoppelt zu einem Wasser-Barackenspitale werden. Eine solche Floss-Baracke oder das Wasser-Barackenspital

könnte an einen Schleppdampfer angehängt und nach verschiedenen Richtungen bewegt werden. Als Vorzüge solcher mobiler Wasser-Baracken wären namhaft zu machen: Sie haben keinen siechhaften Boden; sie sind einfacher und billiger herzustellen als die Land-Baracken; die Reinlichkeit und Ventilation ist leicht zu erzielen; die Temperatur in denselben ist auch während der grossen Sommerhitze eine gemässigte; die einzelnen Floss-Baracken können leicht den Ort, die Stellung und die Richtung wechseln. Bei Strömen mit grossem Gefälle könnte die Wasserkraft zur Ventilation, Beleuchtung und andern mechanischen Arbeiten verwendet werden. Die Wasser-Barackenspitäler werden ohne Zweifel auch ihre Nachtheile haben, doch scheint mir die Frage über die Errichtung der schwimmenden Baracken der Discussion werth zu sein.

Mögen jedoch die Spitäler noch so gut eingerichtet sein, die Schädlichkeit des Hospitalismus wird niemals ganz zu beseitigen sein; immer wird die Gefahr, die aus der Anhäufung und Ansammlung vieler Kranken auf einen beschränkten Raum entspringt, vorhanden sein. Die Unterbringung der Kranken in Spitälern soll daher auf das unumgänglich nöthige Maass beschränkt bleiben. Es soll das Princip der Krankenzerstreuung so viel als möglich zur Anwendung kommen. Es würde sich empfehlen, die Krankenzerstreuung territorial einzurichten, d. h. die Kranken in jene Bezirke in Behandlung zu übergeben, aus denen sie stammen, wo sie ihre Jugend verlebt, Angehörige und Verwandte haben, wo sie acclimatisirt sind, wo sie ihre heimische Kost, Sitten und Gebräuche wieder finden.

Auch in der Frage der Krankenzerstreuung wäre ein Princip zu bringen. Die Kranken wären in dieser Richtung in Kategorien einzutheilen, und zwar: *a*) In solche, die von der Krankenzerstreuung aus verschiedenen Gründen ausgeschlossen sind. *b*) In solche, welche obligatorisch in die territoriale Bezirke, behufs Entlastung der Kriegsspitäler, zu evacuiren sind. *c*) In solche, deren Evacuirung eine fakultative ist, wo Opportunitätsgründe für und gegen die Evacuation den Ausschlag geben werden.

Noch ist eine Gattung von Sanitäts-Anstalten im Kriege zu erwähnen, die nicht den Charakter der Heilanstalten haben, die bloss Warte- und Erholungs-Stationen sind. Es gibt nämlich bei jeder Truppe eine Anzahl von Menschen, die nicht krank sind, auch keiner Behandlung bedürfen, die aber durch momentane Erschöpfung oder aus anderen verschiedenen Ursachen vorübergehend die Bewegungen der Truppe nicht mitmachen können. Solche Soldaten dürfen nicht in ein Spital gesendet werden, wo sie die Anhäufung der Kranken und die Gefahren des Hospitalismus vergrössern und leicht eine Krankheit acquiriren können. Dieselben sollen aber auch nicht weit hinter den Kriegsschauplatz zurück gesendet werden, weil sie dann leicht für die Truppe verloren gehen könnten. — Solche Soldaten, die in dem Zeitraume von 3 bis 8 Tagen wieder den Dienst bei ihrer Truppe machen könnten, sind für diese Zeit in die Warte- oder Erholungs-Anstalten unterzubringen. Diese sind in der Nähe der Truppe gewählte Häuser, Scheuern, Schuppen, Speicher, Zelte, (nur im äussersten Nothfalle ein Lager, ein Bivouak), in welchen die Erholung bedürftigen Soldaten durch drei bis acht Tage unter der Aufsicht von Offizieren oder Aerzten unterzubringen und nach Ablauf dieser Zeit ihrer Truppe nachzusenden sind.

Diese Erholungs-Anstalten wären bei jeder Brigade zu etabliren, sind keine stabilen Anstalten und hätten absatzweise der Brigade nachzurücken, um nicht zu weit von ihrer Truppe zu bleiben.

Schliesslich wären noch jene Einrichtungen der Kriegsspitäler zu besprechen, die sich als nothwendig erweisen, weil eine Gruppe von Krankheiten gegenwärtig als Infektions-Krankheiten zu bezeichnen ist. Diese Einrichtungen betreffen die Fussböden, die in allen Kriegs-Spitälern durch feuchtes Abwischen, ohne Staub zu erzeugen, sollen gereinigt werden können. Die Fussböden müssen daher entweder einen

Wachs-, Oel- oder Theerfirniss-Anstrich haben oder dieselben müssen mit Wachstuch überspannt sein. In gleicher Weise wären die Wände einzurichten; auch diese sollen täglich feucht abgewischt werden.

In den Kriegsspitälern sollen alle Strohsäcke und Strohpolster beseitigt und durch feine Holzfasern aus Nadelhölzern (mit Maschinen bereitet) ersetzt werden, weil das Stroh brüchig, zerreibbar ist und Staub und Krankheiten erzeugt, während die feinen Holzfasern elastisch und aromatisch sind, das Ungeziefer abhalten, steril, billig und in beliebiger Menge herstellbar sind.

Die Matratzen aus Rosshaar oder Holzfasern sollten mit einem Wachstuche bedeckt sein, oder anstatt in einen gewöhnlichen, in einen Wachstuch-Ueberzug gefüllt sein, weil der Detritus der Haut, der Leib- und Bettwäsche Bakterien enthält, die durch das Leintuch nicht zurückgehalten werden können und auf und in die Matratze übergehen und eindringen können. Die Reinigung und Desinfektion einer Matratze ist umständlich und kostspielig; wenn dieselben einen impermeablen Ueberzug besitzen, lassen sich dieselben mit Karbolsäure reinigen und desinfiziren.

Eine der häufigsten Quellen der Uebertragung und Verschleppung ansteckender Stoffe in den bisherigen Spitälern ist wohl in dem offenen Wechsel der Leib- und Bettwäsche und in dem freien Tragen derselben durch die Zimmer und Gänge. In dem Detritus der Haut und der Wäsche sind zahlreiche Bakterien, darunter auch pathogene Bakterien. Beim offenen Wechsel der Wäsche haben die Mikroben Gelegenheit, sich in der Luft auszubreiten und die Mitkranken des Zimmers zu infiziren, und beim Tragen derselben durch die Zimmer, Gänge, Treppen u. s. w. ist Gelegenheit zu einer weiteren Ausstreuung dieser Mikroben. Es wird deshalb die Forderung gestellt, beim Wechsel der Leibwäsche das Bett durch Blenden abzuschliessen und die gewechselten Wäschestücke direkt vom Körper oder vom Bett in eine hermetisch zu verschliessende Kiste zu bringen und in dieser die schmutzige Wäsche in die Schmutz- oder in die Waschkammer zu bringen. Wenn es thunlich ist, kann die Schmutzkiste Karbolsäure oder eine andere desinfizirende Flüssigkeit enthalten. Auf diese Weise kann der Verbreitung und Verschleppung von Bakterien enthaltendem Detritus in den Krankensälen und Gängen Schranken gesetzt werden.

Das Gesagte lässt sich in folgende Thesen für die Discussion zusammenfassen:

1. In allen bisherigen Kriegen war die Zahl der durch Krankheit dienstuntauglich gewordenen Soldaten viel grösser als jene, die durch feindliche Waffen verwundet worden sind. Man nimmt an, dass die Heeresleitung für Kranke in der Anzahl von 10 pCt. der Ist-Stärke zu sorgen hat. Im Falle von Epidemieen ist dieser Procentsatz entsprechend zu erhöhen. Auch die Zahl der Verwundeten ist in den 10 pCt. nicht einbegriffen.

2. Dieses Procent-Verhältniss wird auch in künftigen Kriegen nicht besser, aber auch nicht schlechter sein, weil die krankmachenden Ursachen, die sich nicht beseitigen lassen, dieselben bleiben werden. Diese Ursachen sind: meteorologische Einflüsse, die Schädlichkeiten des Bodens, die qualitativ und quantitativ nicht immer entsprechende und einförmige Nahrung, die Trinkwasser-Frage, erschöpfende und aufreibende Märsche und physische Anstrengungen, aufregende, das Nervenleben erschöpfende Gemüths- und moralische Eindrücke, der Mangel an physischer und geistiger Ruhe, sowie die vernachlässigte Hautpflege.

3. In Folge des Krieges werden daher Krankheiten aller Systeme und aller Gewebe sich entwickeln, von denen ein gewisser Procentsatz nicht wird zurückgeschickt werden können und in den Spitälern wird behandelt werden müssen. Die medikamentöse Ausrüstung dieser Hospitäler muss daher für die Krankheiten der Nerven, wie für jene der Circulation, Sekretions- und anderer Organe eingerichtet sein. Man wird also von dem bisherigen Modus, nur wenige Arzneikörper in's Feld mitzunehmen, einigermassen abgehen müssen.

4. Der von Sir James Simpson, von Pirogoff aufgestellte Begriff des Hospitalismus erfährt durch unsere bakteriologischen Anschauungen eine erhöhte Bedeutung. Es sollten demnach Kasernen, Schulen, Kirchen und öffentliche Versammlungs- und Belustigungsorte nicht zu Kriegs-Spitälern adoptirt werden, andererseits dürfen derlei zu Kriegszwecken adoptirten Baulichkeiten nach Beendigung des Krieges erst dann wieder ihrer früheren Widmung als Kaserne, Schule etc. zugeführt werden, bis auch die Mauer-Zwishenräume frei von pathogenen Bakterien sind.

5. Es ist festzustellen, welchen Krankheiten die Aufnahme in den Kriegs-Spitälern nicht verweigert werden kann, welche Krankheiten für den Rücktransport unter allen Verhältnissen zu bestimmen sind, und welche temporär Undienstbare in die Feld-Warte- und Erholungsanstalten zurückzusenden sind.

6. Die zum Rücktransport ausgewählten Kranken sind theils in solche hinter dem Kriegsschauplatz gelegene Spitäler, zum Theile aber nach dem Principe der Krankenzerstreuung zu evacuiren. Es ist vom Vortheil, die Krankenzerstreuung territorial einzurichten.

7. Feld-Warte- und Erholungsanstalten sind Sanitäts-Anstalten, in welchen Soldaten, die durch 3—8 Tage undienstbar, aber nicht krank sind, in geeigneten Lokalitäten unter der Aufsicht von Offizieren oder Aerzten sich erholen, um nach Ablauf dieses Zeitraumes der Truppe nachgeschickt werden zu können. Solche Erholungs-Anstalten sind jeder Brigade beizugeben. Damit die Warte- und Erholungs-Anstalten nicht zu weit hinter ihrer Brigade zurückbleiben sollen, ist es nothwendig, dass diese Anstalten der Truppe stationair folgen.

8. Wie für äusserlich, chirurgisch Kranke, ist auch für innerlich Kranke der Begriff "*intransportabel*" wissenschaftlich zu erläutern und durch präcise Indikationen zu bestimmen.

9. Unbeschadet unserer bakteriologischen Anschauungen, nach welchen alle Krankheiten ohne Ausnahme durch Mikroben erzeugt werden sollen, daher als Invasions- oder parasitäre Krankheiten aufzufassen sind, müssen einige dieser Krankheiten, wie die *Malaria*, die *intermittens* und *recurrens* etc., die, an die Lokalität gebunden, nicht von Menschen auf Menschen übertragen werden können, als nicht infektiöse Krankheiten bezeichnet werden; während andere Krankheiten, wie die *Tuberculose*, die *Meningitis cerebro-spinalis*, die bisher nicht für ansteckende Krankheiten gehalten wurden, als Infektions-Krankheiten zu bezeichnen und zu behandeln sind. — Ihre Aufgabe soll es sein, in einer Resolution es auszusprechen, dass es sich empfiehlt, für die Kriegsspitäler die in denselben aufzunehmenden Krankheiten in zwei Kategorien, in die Kategorie der infektiösen und in jene der nicht ansteckenden, einzutheilen.

10. Die Infektions-Krankheiten, die bisher nicht für infektiös gehalten wurden, erheischen eine eingehende skrupulöse Desinfektion, wie die akuten Exantheme, der Flecktyphus etc., während bei den bakterischen Krankheiten, die als nicht infektiös erkannt worden sind, die alte übliche Massregel der Reinlichkeit vollkommen ausreicht, um den nachfolgenden Beleger des Bettes gegen jede Uebertragung von seinem Vorgänger zu schützen.

11. Die gegenwärtige Eintheilung der Kriegsspitäler ist ohne Rücksicht auf ihre Entfernung vom Kriegsschauplatz zu geschehen: *a*) In schon bestehende und stabile oder bleibende Hospitäler, grösstentheils steinerne Baulichkeiten. *b*) In neu zu errichtende, nur für die Kriegsdauer bestimmte, dann aufzulösende Baracken-Hospitäler, grösstentheils hölzerne Baulichkeiten. *c*) In mobile, nur für einige Tage zu benützende Spitäler. Es sind dieses die Eisenbahn-Sanitätszüge, die Schiffs-Ambulanzen und die aus gewöhnlichen Kranken-Transportwagen bestehenden Ambulanzen, welche die Bestimmung haben, die Kranken von einem Ort auf den anderen zu transportiren und die Kranken während dieser Zeit zu beherbergen, zu verpflegen und ärztlich zu behandeln. In der jüngsten Zeit wurden in der Ausstellung in Amsterdam mehrere Systeme

eines transportablen Krankenzeltes ausgestellt und prämiirt. Die Zukunft muss lehren, ob aus dem transportablen Krankenzelt dereinst ein transportables Spital sich entwickeln wird.

12. In Gegenden, die von mächtigen Strömen durchzogen werden oder die an grössere Seen oder Meere grenzen, wäre die Neuerrichtung von sogenannten Floss-Baracken und die Zusammensetzung zu einem Wasser-Barackenspitale mit manchen Vortheilen verbunden. Dieser Vorschlag scheint daher werth zu sein, in Erwägung gezogen und discutirt zu werden.

13. In den neuen Kriegsspitälern sollte der Fussboden und die Wände impermeabel gemacht, zum Abwischen mit einem feuchten Tuch und zum Desinfiziren mit Karbolsäure geeignet gemacht, also mit einem undurchlässigen Oelfirniss (der Fussboden mit einem Theer-Ueberzug) oder mit Wachstuch überzogen werden.

14. Das Stroh wäre aus den Kriegsspitälern ganz zu verbannen und durch feine Holzfasern (aus aromatischen Nadelhölzern mit der Maschine erzeugt), zu ersetzen. Die Holz- und Rosshaar-Matratzen sind in Wachstuch-Ueberzüge einzufüllen, um dieselben leichter reinigen und desinfiziren zu können.

15. Zur Verhütung einer Uebertragung und Verschleppung von Infektionskeimen beim Wechsel der Leib- und Bettwäsche auf die Krankensäle und Gänge soll dieser Wechsel in einem durch Bettblenden abgegrenzten Raum erfolgen, die schmutzige Wäsche soll von Bett und Kranken in eine hermetisch geschlossene Kiste gelegt und mit dieser in die Schmutz- oder Waschkammer geschafft werden.

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## ON THE BEST MODELS AND MOST EASILY CONSTRUCTED MILITARY HOSPITAL WARDS FOR TEMPORARY USE IN WAR.

### DES MEILLEURS MODÈLES D'AMBULANCES, ET LEUR CONSTRUCTION AISEMENT CONSIDÉRÉE POUR L'USAGE TEMPORELLEMENT DANS LA GUERRE.

### ÜBER DIE BESTEN MUSTER UND MÖGLICHST LEICHT ZU ERRICHTENDEN MILITAIR-HOSPITALBARACKEN FÜR ZEITWEILIGEN GEBRAUCH IM KRIEGE.

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In the construction of temporary military hospitals during war, after due consideration as to site, salubrity of locality, natural drainage, water supply, and accessibility is had, experience demonstrates that the economy of material and the facility with which it can be procured are of paramount importance. The rapidity with which the wards and other necessary apartments may be erected, utilizing unskilled labor in doing much of the work, should also be considered. Therefore all unnecessary architectural devices and decorations should be ignored. Simplicity is an important factor in the work of improvising with rapidity, temporary military hospitals, and should be rigidly adhered to in planning them ; every attempt of greedy contractors to add unnecessary cost to their construction should be firmly resisted by the medical officers in charge.

In the United States, modern structures are more economical than those built of stone, and can be most rapidly built.

The sidings (the walls) can be constructed of rough sawn boards, twelve feet long and one inch thick, the openings between them being covered by battens.

The wards of temporary hospitals ought never to be wider than is necessary to accommodate two rows of bunks, so arranged that their head boards shall stand at least a foot distant from the walls, the foot boards of opposite bunks not approximating nearer than five feet, thus affording a longitudinal aisle extending from one extremity of the ward to the other. No ward ought to be wider than from twenty-two to twenty-four feet. If wider, heavier sleepers upon which to lay the floor, and more labor in putting them down, will be necessary, than is compatible with rapidity of construction.

Wards of a width to accommodate only two rows of bunks arranged as above described, may be built of any length desired, and their erection can be completed in a very short time by laborers, using only the hammer and the saw.

At suitable intervals, in the sides of the wards, windows may be cut. In the absence of window sash and glass, battened shutters, hung upon hinges at the top, can be easily constructed of the rough material at hand. These can be propped open at various distances at the bottom as occasion may require.

I prefer these narrow wards on hygienic considerations. For when there are more than two rows of bunks, patients lying on the interior rows are forced to inspire the air previously rendered impure by the expired and other gaseous emanations from the bodies of the patients on the outer rows.

These wards ought to be ceiled overhead. At intervals of twelve feet, flues ought to penetrate this ceiling, reaching above the comb of the roof. A board sawn to fit the bottom of each flue and well balanced on pivots, will successfully serve the purpose of a valve, with which to open and close it as occasion may require.

But neither these flues nor the so-called ridge ventilation of hospital wards is adequate to drive out, successfully, all the impure air of an hospital ward occupied to its full capacity.

Experience taught me that the air of the wards could not be kept pure by the ridge ventilation alone. Hence I adopted, in the construction of the hospitals erected in Chattanooga, Tenn., at Kingston, Ga., and elsewhere in the department under my direction, the "side ventilation," which I will now proceed to describe (Fig. 1). I claim for it a superiority over the ridge system of ventilation, and that, in practice, it is acknowledged by all medical officers who had opportunities of comparative observation, to have completely solved the problem of securing almost absolute purity of air in hospital wards occupied to their full capacity by badly-wounded men.

At the floor, and just under the ceiling of the wards, openings in the walls, two feet in length and one foot in height, at intervals corresponding to the proposed location of every bunk, are cut. The openings may be closed at will by sliding shutters. The diagram marked A (Fig. 1) shows an elevation of the side wall, with openings at intervals above and below.

The direction of the currents of air, when the side ventilating openings are utilized to sweep out the impure air of the wards, is shown in the following cross section, marked B (Fig. 2).

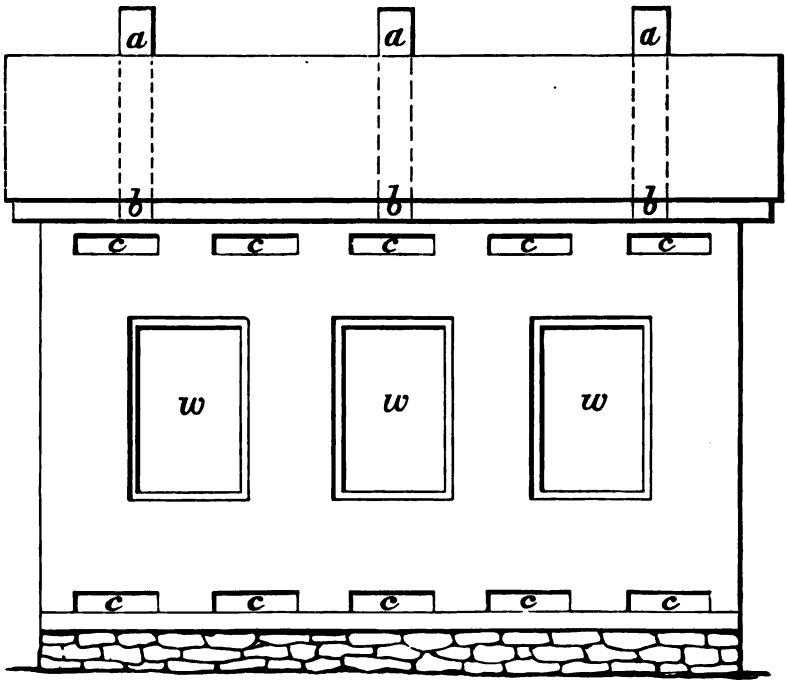
With this system of ventilation, the patients being kept upon their bunks, the impure air of the ward could, in a few minutes, be swept out, without injury to either the sick or wounded from the draft.

Ordinarily the ridge flues and some of the ventilators at the floor being kept open, the wards are kept sweet.

The rough boards used in the construction of these wards were frequently white-washed with lime. In none of them did hospital gangrene or erysipelas ever become epidemic.

Nothing has been said about the construction of the administrative apartments of

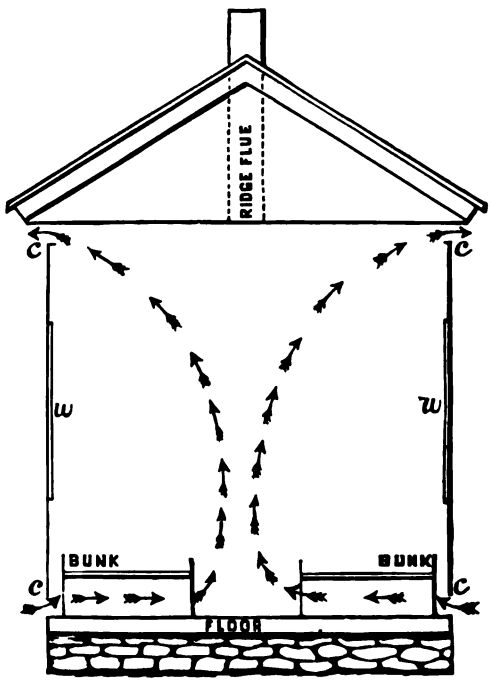
FIG. 1.
A




PLAN OF A WARD.

*a*, *b*, ventilating flues, extending from ceiling of ward through ridge of roof; *c*, *c*, *c*, side ventilating openings at the floor and under the ceiling; *w*, *w*, windows.

FIG. 2.
B



military hospitals, because I have nothing novel to propose in regard thereto. I have this to say, however, that in my opinion there should be no apartments adjoining the wards for the sick and wounded in such a manner that, in any way, the air may be drifted into the wards. No dish-washing should be permitted inside of the wards of a military hospital. Nor should there be any furniture in them, save only the bunks and bedding of the patients. Shelves, tables, flower stands, and anything else that will tempt patients or lazy nurses to leave lying in the ward fomites of any kind, should be forbidden.

The wards for the sick and wounded are the most important apartments of military hospitals; indeed, of hospitals for use in civil life everywhere. I have, therefore, confined this paper to a description of the kind of a ward that can be most rapidly and economically constructed to meet the demands of humane and scientific treatment. The above plan of a ward, and its method of ventilation, are based upon the application of scientific principles. Their wisdom was vindicated by two years of experience in the latter part of the great American civil war, when I had ample opportunities of testing it by observation and the comparison of results of treatment in hospital wards of a great variety of plan and construction, in the department then under my direction, which was so extensive, that the number daily under treatment varied from three thousand to within a fraction of twenty-three thousand sick and wounded men.

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## ARE WOUNDS FROM EXPLOSIVE BALLS OF SUCH A CHARACTER AS TO JUSTIFY INTERNATIONAL LAWS AGAINST THEIR USE?

### LES BLESSURES DES BALLES EXPLOSIVES, SONT-ELLES TELLES QU'ON DOIVENT EN DÉFENDRE L'USAGE PAR DES LOIS INTERNATIONALES?

### SIND WUNDEN DURCH PLATZKUGELN DERARTIGER BESCHAFFENHEIT, UM INTERNATIONALE GESETZE GEGEN DEN GEBRAUCH SOLCHER GESCHOSSE ZU RECHTFERTIGEN?

BY ROBERT REYBURN, M. D.,

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The proper decision of the question whether explosive balls should be prohibited by international law, is largely influenced by the changed conditions of modern as compared with ancient warfare.

Human history is mostly composed of the biographies of rulers of mankind, who have waged wars either to gratify their insane ambition or out of hatred of those nations or peoples who refused to submit to their authority. During all the innumerable wars which have occurred from a period ante-dating written history to the present time, men have been earnestly endeavoring (with an ingenuity worthy of a better cause), to find new and more destructive agents by which they might more easily destroy and mutilate the bodies of their fellow men.

In our day, the perfection attained in the various forms of large and small rifled projectiles has been truly wonderful, and the destruction of human life in the great battles of modern times, has assumed the accuracy of an algebraic equation. The

philosopher in studying the gloomy record of the histories of wars would have little to comfort his soul were it not for the admitted fact, that the improvements in the construction of projectiles and firearms used in war, have been accomplished with a marked diminution in the relative mortality of the combatants engaged in the battles of modern times as compared with the ancient.

A battle in the days before the invention of gunpowder was in a great measure a succession of single combats. Men selected their antagonists and fought with them man to man, and after being disabled, were usually summarily dispatched, or if not put to death at once were saved for a bondage worse than death. Often after being publicly exhibited as part of the spoils of the conqueror, the prisoners were slaughtered in cold blood.

Now, among civilized nations during warfare, when the enemy becomes disabled from wounds, he generally receives all the care and attention necessary in his helpless condition, either from his comrades or often from his late antagonists. The chief endeavor in the battles of ancient times was to kill as many of the enemy as possible in a given time. The same end is attained in modern battles, but it has been found that an enemy wounded sufficiently to become *hors de combat*, is practically much more a source of weakness to his comrades than if he were slain in battle. When he is severely wounded not only is he as useless to the army as if he formed no part of it, but he has wants to be attended to, that require the services of many men who could otherwise be employed in active duty as soldiers.

Humanity which finds a lodging place even in the bosom of "grim visaged war," demands that ambulance corps shall be provided for the carriage of the wounded soldier to a place of safety; that hospital surgeons, stewards and nurses shall be engaged in attending him, while a large portion of the commissary's and quartermaster's department has to be employed in furnishing him with needed supplies and transportation. Not only is this the case at the time he receives his wound, but this disability continues for weeks and months, in fact, during the entire period of his convalescence. In place of aiding in the active duties of warfare, the sick or wounded soldier is a hindrance instead of a help.

The objection may be made to this statement, that a great portion of the care the wounded soldier requires, may be given by non-combatants or by persons unfit for military duty. While this is true to a certain extent, yet by far the greater portion of the attendance required, demands the services of able-bodied men. It is probably too low an estimate to state, that every wounded man needs the services of two able-bodied men for his care and sustenance until he becomes again fit for military duty. If then the object of modern war is not the taking away of life, but rather the disabling, and rendering unfit for military service the enemy's soldiers, why should the inevitable horrors of war be further aggravated?

The use of explosive balls does not accomplish any more effectually the disabling of the combatants, but converts slight wounds into grave and fatal injuries of the vital organs. The characteristics of wounds caused by explosive balls and bullets, are great shattering of the bones at point of injury with comminution of the fragments, the soft tissues being extensively lacerated, with destruction of the parts, and this is followed by extensive sloughing. In many cases the powers of nature are insufficient to repair such extensive loss of tissues. These injuries are also often accompanied by the dangers of primary and secondary hemorrhage, and are frequently followed by erysipelas and pyæmia.

During the early part of the late war of the Rebellion (United States), explosive balls were used for a short time by both the United States and Confederate troops, but their use was soon abandoned and never resumed.

We saw a few of these wounds occurring in patients brought from the battle of

Second Bull Run in 1862. Some thousands of Gardner's explosive balls (33,350), were issued to the United States troops in the early part of the war.

The "Medical and Surgical History of the Rebellion," vol. 3, p. 702, describes these Gardner's explosive bullets, as follows:—

"These Gardner's explosive bullets or musket shells, were cylindra-conoidal projectiles of lead, made in two sizes; the larger of calibre 58, weighing four hundred and fifty-one (451) grains, the smaller of calibre 54, weighing three hundred and sixty-three (363) grains. Within the interior is placed an accurately fitting acorn-shaped chamber, filled with fulminating mercury, and communicating with a 1¼ time fuse which is exposed to the rear of the missile; the fuse is ignited by the discharge of the piece. The bursting charge is sufficient to rend the bullet, and transform it into a jagged, dangerous missile. Should it have penetrated the body before exploding, its effects are still more destructive."

The subject of the employment of explosive balls or missiles, has been a matter of contention among the military powers of Europe from the time of the discovery of the fulminates until the present time. During the year 1868, by an agreement made by all the principal nations of Europe, at an International Military Conference, which was held at St. Petersburg in October of that year, all the great powers resolved to abstain from the use of explosive projectiles under the weight of four hundred (400) grammes.

The text of a portion of this treaty is as follows:—

"Considering that the progress of civilization ought to have the effect of lessening as much as possible the calamities of war.

"That the only legitimate object that States ought to propose to themselves during war, is to weaken the military strength of their enemies.

"That for this purpose it is sufficient to put *hors de combat*, the greatest number of men possible; that this end will be overpassed by the employment of arms which would uselessly aggravate the wounds of men placed *hors de combat*, or that would render their death inevitable; that the employment of such arms would be consequently contrary to the laws of humanity.

"The undersigned, having received the orders of their governments in this respect, are authorized to declare as follows:—

"The contracting powers mutually bind themselves to renounce, in case of war among themselves, the employment by their land and sea forces, of all projectiles charged with explosive or inflammable matters of a less weight than four hundred (400) grammes."

For the reasons so well and cogently expressed in the language of the above treaty, and for the sake of common humanity, we believe that the use of explosive balls or bullets should be forever prohibited by international law.

# ARE WOUNDS FROM EXPLOSIVE BALLS SUCH AS JUSTIFY INTERNATIONAL LAWS AGAINST THEIR USE IN WARFARE?

## LES BLESSURES DES BALLES EXPLOSIVES, SONT-ELLES TELLES QU'ON DOIVE EN DÉFENDRE L'USAGE À LA GUERRE PAR DES LOIS INTERNATIONALES?

## SIND WUNDEN DURCH PLATZKUGELN DERART, UM INTERNATIONALE GESETZE GEGEN DEN GEBRAUCH SOLCHER GESCHOSSE IM KRIEGE ZU RECHTFERTIGEN?

BY CHARLES HOBART VOORHEES, M. D.,

Of New Brunswick, N. J.

The use of Explosive balls in warfare among civilized nations is inhuman and barbarous. In warfare the result aimed at, is placing the soldier *hors de combat*. This can be done in a more humane manner and as effectively by less destructive projectiles; those that will immediately and consecutively produce less deaths and less destruction and mutilation of the parts, consequently less suffering, and without the additional danger of poisoning the wounds and the general system by the chemical substances used in the explosive balls as an explosive material. The substances which are at present in use and those upon which experiments are being conducted for their adaptation to this purpose, are Fulminate of Mercury, Nitro-Glycerine, Dynamite, Roburite, Melanite, etc.

The Explosive ball, when detonized, also causes a greater shock than the ordinary projectile. When it explodes after penetrating the body, it produces a double shock, which, in itself, renders recovery and the success of an operation more doubtful; in fact, the sufferer may never recover from the *shock*, as is frequently seen in railway accidents.

The aim in warfare is not to destroy life or mutilate men to a greater extent than is necessary, but to wound and maim the soldier to such a degree that he is unfitted for the present as an active combatant, and may remain unfitted for a longer or shorter time for active service in the armies of his country. A wounded man may be permanently disabled or he may be so far disabled—except in the most simple wounds—as to prevent him from returning to the ranks within six months or a year.

The discipline of the infantry arm of the service and the constant attention of the drill officers in the United States Army is to impress upon the rank and file the importance of taking deliberate aim and to fire low, so as to render his fire effective and to maim his antagonist. Every wounded man takes two effective men from the ranks to remove him (to the rear) from the field of action, while the man killed outright is left where he has fallen, and is himself only lost as a combatant.

This is a subject that appeals to the hearts, the minds, the sympathies and the deliberations of the political economists and diplomats of the various civilized nations who are so placed geographically as to be in constant danger of international complications, the consequences of which are too frequently useless and unnecessary wars for the aggrandizement of rulers or acquisition of territory, to enlarge state boundaries, and add to the population a people foreign in habits and customs, and who are usually discontented under the laws and régime of their new national environment.

From a humane and financial point of view it certainly deserves serious consideration. The smaller the number of men killed outright, the less that are seriously maimed and mutilated so as to be unable again to follow their usual avocations (upon their retirement from the service and a return of the country to a state of peace) and become self-supporting citizens, the less there will be to become a burden upon the State and the people. If so maimed as to be unable to earn their own livelihood they

then become numbered among the dependent classes; they are pensioners, the inmates of soldiers' homes or poor-houses, the latter paupers, while the former become wards of the nation, and the people are correspondingly taxed for their support. What an incubus upon the State, what an expenditure of money is the result, and all to come out of the products of manufacture, merchandise, agriculture, art and labor, out of the thrift and toil of the nation! And this not only for themselves, individually, but for their dependent families. More than this, the offspring of this dependent class are apt, from their surroundings and the example before them, to fall into the dependent class themselves (paupers), although able to earn their own livelihood. We have seen this as the result of our great internecine struggle. This state of dependency is not a temporary one, dying with the generation, but becomes in too many cases a permanent burden, affecting the people and the State from generation to generation thereafter, and outliving the political complications which caused it.

While we are all well aware that war is at times a necessity for the life and welfare of a nation, and that it must be destructive to life and limb, that casualties must occur, that it has its financial complications and moral disasters, that it is not a game which men can play at with impunity, yet still there are certain humane, financial and moral complications that should lead to the amelioration of its horrors and effects, which are not positive factors for its success. From an economic standpoint, every man killed outright, or dying from wounds, is a loss of $1000 (according to Adam Smith's "Wealth of Nations." Later political economists make it $1400) to the wealth of his country; it is a producer lost; and the same may be said of the soldier so mutilated as to be unable again to be a producer, who only remains among us as a consumer. I know the watchword of late is—Make wars "short, sharp and decisive." This means improved rifles, Maxim guns, destructive explosives, and cannon of great weight and large calibre with heavy charges of powder and enormous projectiles, with their consequences—great destruction of life and limb. The advocates of this doctrine hold that it will render the war shorter, consequently with less loss of life and suffering in the aggregate, and that it will be a saving financially to those engaged in the struggle.

The ratio of killed and wounded has steadily increased with the improvement in the power and range of firearms, from the Franco-Austrian war in 1859, to the Turko-Russian war of 1877; and to so great an extent, that humanity demands that such projectiles as explosive bullets which aggravate the wounds of men and unnecessarily increase the suffering of the wounded, as well as the mortality primarily and secondarily, should be abolished in civilized warfare. (See Notes A and B, "Statistics of Wounded and Killed in Modern Wars.")

We find in the published records of the Surgeon General's and the Ordnance Office, evidence that the War Departments of the Confederate and Federal Governments both issued explosive bullets to their troops in the field—to a limited extent—during the Civil War. "The shells issued by the Federal Government contained fulminate and had a time-fuse. It is claimed that others were used, one of which was fitted with a percussion cap, said to be so sensitive that it exploded upon impact with the soft tissues." (See Note C.)

During the war and since, the growing sentiment of the age has been against their use, and great progress has been made toward removing this missile from the armaments of nations.

The convention which met at Geneva in 1864, in regard to "ambulances and the wounded on the field of battle," by their proceedings, opened the way to the compact between the principal nations of Europe, signed by their representatives at the International Military Convention, held at St. Petersburg in October, 1868, "by which agreement it was resolved to abstain from the use of explosive balls under the weight of 400 grammes." (See Notes D and E.)

This agreement is limited in extent and subject to contingencies, on account of the cis-Atlantic powers not being represented in the convention, and all of the trans-Atlantic powers not being parties to the compact. According to the articles of agreement, if one nation, a party to the compact, declares war against another nation agreeing to and signing the articles, and either one allies herself to a third, not being a party, the agreement is annulled, and all parties concerned are allowed to use the prohibited projectile. While this was all that could be effected under the circumstances at the convention at St. Petersburg, yet, still, it is not sufficient for the cause of humanity and the welfare of nations, as it opens the door to the indiscriminate use of reprehensible projectiles, and may be the cause of rendering all previous acts nugatory and leave every nation free to use whatever missile it may deem necessary for its success, setting back the hands on the dial of humanity for generations, and inflicting needless suffering upon thousands of our fellow creatures. (See Note D.)

To make the agreement general and obviate future complications, an International Congress should be called at an early date, to which every civilized nation on both hemispheres should be invited to send representatives.

This convention should meet at some place centrally located geographically, or approximately so, according to the advantages of transportation. Each should have an equal representation, according to its population and position as a warlike power, that, so far as possible, a result may be arrived at which will be alike favorable to all and without dangerous contingencies. As the European powers initiated the movement which brought about the convention at St. Petersburg, it is now the duty of the United States Government to take the initiative and request the powers to join in a second congress for the purpose of abolishing by international laws such projectiles as may be deemed barbarous and unnecessary in war.

To promote the assembling of a second congress, I submit the following :—

*Resolved*, That in accordance with the sense of this Section, the Secretary be instructed to present this opinion to the Ninth International Medical Congress, and ask that the Congress direct that the expression of their opinion on the subject of international laws against the use of explosive bullets in warfare be forwarded to the President and Secretary of State of the United States, and to each representative of the Foreign Legation at Washington, with a request that each shall transmit the same to their respective governments.

RECAPITULATION.

The effect of explosive balls is to cause an unnecessary destruction of life, and mutilation. Whenever such projectiles take effect upon the head, neck or trunk, they almost invariably cause death by the destruction of the bony and soft parts, with consequent hemorrhage, from the internal organs, and by shock. When they take effect upon the limbs, the upper and lower extremities, they destroy the osseous structure and soft tissues so extensively that, as a general rule, less of the member can be saved by surgical operation, and such operation is more likely to be attended by after complications. They expose the victim to greater dangers from erysipelas, gangrene, pyæmia, tetanus and the suppurative process, as well as the poisonous influence of the chemicals used to prepare the explosive compound. The skin and muscles may be devitalized, and yet not to such an extent but that it may deceive the most experienced military surgeon, who, after his laudable effort to save as much of the limb as is in his judgment possible, may have the chagrin, after a few days, to find an extensive slough of the flap, rendering necessary an opening of the wound and the removal of more of the bone, or a second amputation to be necessary.

When wounds from distorted bullets take place upon the trunk and are not immediately fatal, or upon the limbs and amputation or excision is not deemed necessary, they create, by their size and the irregularity of the tract, inflammation and profuse

suppuration; abscesses, sinuses and fistulous canals form, exhausting the sufferer and rendering convalescence protracted and tedious; or he may die from exhaustion, or any one of the complications named in the preceding section. Painful cicatrices, contractions and deformities are a natural sequence of this class of injuries. (See Note F.)

I have experimented with a rifle carrying an explosive conoidal ball of regulation size, upon wood, and found the perforation larger in diameter than the ordinary Minie (that is, when the ball exploded—sometimes it fails). The board was shattered and splintered to a much larger extent. How much greater, then, will be the effect upon the osseous structures of the human body.

The majority of people comprising every civilized nation upon the face of the earth, combatants and non-combatants, I think, will lift up their voice in condemnation of this projectile, and in favor of its being excluded from the warfare of such nations; and that such nations would be ever grateful to the Ninth International Medical Congress, if, by their scientific investigations and humane efforts, in council and out, they may be the means of having this barbarous and wantonly destructive projectile abolished by international laws.

It is the duty of the surgeon, in this great era of the world's advancement, to consider not only the final result of his surgical operations, but the consequences and final results of the methods of war as they relate to the future welfare of the people of the State and of civilization.

I want it distinctly understood by the Section, that I am not in favor of child's play in war, or that it shall be carried on by mild means. I do not court it. It should be avoided if possible; but when it does come of necessity, I am like Palafox, of Saragossa, when Spain was invaded by the legions of Napoleon under Marshal Soult, whose exclamation, "War to the knife!" has passed into history. Deprecate it as we may, arbitrament by arms will continue to occur whenever the exigencies of the circumstances involving the disagreement between nations demand it, so long as the world remains. As Bailey says in "Festus":—

> "War must be
> While men are what they are; while they have bad
> Passions to be roused up; while ruled by men;
> While all the powers and treasures of a land
> Are at the beck of the ambitious crowd;
> While injuries can be inflicted, or
> Insults be offer'd; yea, while rights are worth
> Maintaining, freedom keeping, or life having,
> So long the sword shall shine; so long shall war
> Continue, and the need of war remain."

I do not refer, in my discussion of this subject, to torpedoes, or shells such as used in the guns of our vessels of war (by the navy), pneumatic guns and the artillery of the army. Such are a necessity in war. They are destructive projectiles, but perfectly legitimate. I refer to the explosive ball of the small arms of the service (muskets and rifles), which are destructive enough, for all ordinary purposes, with the solid conical ball as it goes boring its way through the tissues. I know of but one enemy upon which I would advocate the use of the explosive ball as legitimate, and that would be the common enemy of mankind—the ferocious denizens of the forests and the plains of tropical Asia, Africa and South America; and, perhaps, some of the more dangerous species of North American animals. These beasts have no reasoning powers, and are instinctively cruel. They seek to destroy to appease their hunger. We hunt and destroy them for the purpose of extermination, therefore any missile is legitimate for

their destruction, because it becomes a necessity for the advancement of civilization; but not for man upon his fellow-man, so elevated above the beast of the field in his reasoning, with his highly constructed nervous system so acutely sensitive to suffering, made in the image of his God and with an immortal soul.

### NOTE A.—RATIO OF WOUNDED.

"In the Franco-Austrian war of 1859 the percentage in troops actually engaged on both sides was 7.30." "In the American Civil War of 1861-65, Shiloh, Antietam, Murfreesboro, Gettysburg and the Wilderness the percentage was 16.61." "In the Franco-Prussian war of 1870 the percentage of the whole German army that crossed the frontiers of France was 8.07." "At Vionville the Germans admit a loss of 15 per cent." "In the Turko-Russian war, 1877, the mean percentage admitted by the Russians at the pitched battles of Plevna was 17.34 of fighting troops." Capt. Haverly says: "In collating the above figures, we find that, in the most recent modern wars, the percentage of wounded in troops actually under fire has been 11.97." "The mean of Prof. Longmore's percentages in recent wars, from Magenta in 1859 to Sedan in 1870, of the computed total strength present is 10.07."

### NOTE B.—RATIO OF KILLED.

"In the Franco-Austrian war of 1859 the ratio was 1 killed to 5.6 wounded. In the American Civil War the ratio was 1 to 4.5." "In the Austro-Prussian war of 1866, Prof. Longmore says it was 3.2." In the Franco-German war of 1870, the official account of the Germans killed and wounded gives the ratio 3.1." "In the Turko-Russian war of 1877, from the returns of the second and third battles of Plevna and Shipka Pass, the ratio was 1.8." "In the assault of the Grivitza Redoubt, at Plevna, the Roumanians had more killed than wounded; 1335 killed, against 1176 wounded." (Taken from the paper of Capt. Haverly, Asst. Surgeon, U. S. A., "The Modern Field Sanitary Service and its application to the U. S. Army." *Military Service Institution Magazine*, Vol. VIII, No. 29, p. 73.)

### NOTE C.

"One hundred and thirty cases of wounds attributed to explosive missiles were recorded on the returns in the Surgeon General's Office." "The records of the Ordnance Office of the U. S. Army show that 33,356 Gardner's 'explosive bullets' were issued to the troops in the early part of the war." "No specimens of the percussion cap variety are found in the collection of the Army Medical Museum." "The bursting charge is sufficient to rend the bullet and transform it into a jagged and dangerous missile." ("Medical and Surgical History of the War," Part III, Vol. II, pages 701-2.)

### NOTE D.

"In commenting on this agreement, Dr. Longmore remarks that, 'notwithstanding the international agreement first referred to, there is a great misgiving on the part of many as to the abandonment of explosive bullets in time of war.'" "The Government of the United States has not joined the convention, and the treaty is only obligatory upon the contracting powers when at war between themselves; it also ceases to be obligatory in case of a power which has not joined the convention allying itself to either one of the other belligerents." ("Medical and Surgical History of the War," Part III, Vol. II, p. 701. Prof. Longmore's "Treatise on Gunshot Wounds and their History and Treatment," London, 1877, p. 51.)

### NOTE E.

"The sentiment of the age in this regard is fitly expressed in a compact between the European powers, absolutely forbidding the use of explosive balls. This was a natural corollary of the convention, made at Geneva four years earlier, with regard to ambulances and the wounded on the field of battle." ("Gallaudet," p. 221.)

NOTE F.

"Wounds by distorted bullets, or by elongated bullets revolving on their lesser axis, are more destructive in their nature than the usual wounds from balls intact." "They are followed by a train of most serious complications." "Repair is slow and tedious." "The irregularity of a bullet tract, due to the causes mentioned, constitutes one great source of danger in flesh wounds." ("Medical and Surgical History of the War," Vol. III, Part II, p. 113.

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# ON AGE AND ACCLIMATIZATION OF SOLDIERS IN REFERENCE TO SERVICE.

## DE L'INFLUENCE DE L'AGE ET DE L'ACCLIMATION SUR LE SERVICE DE SOLDATS.

## ÜBER ALTER UND ACCLIMATISATION DER TRUPPEN MIT RÜCKSICHT AUF DEN DIENST.

BY JEFFREY A. MARSTON, M. D., C. B., M. R. C. P.,

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In 1876, the opinion of the most distinguished soldiers in India was asked as to the age at which the British soldier of naturally sound constitution is, for the moment, of the greatest value.

The Commander-in-Chief in India considered that a soldier was at his best from twenty-seven to thirty years of age, with five years' service in India; and that after the age of thirty deterioration sets in. The Adjutant General of the Indian army was of the opinion that twenty-seven is the age at which, for the moment, the British soldier is of greatest value.

As regards service in India, Sir H. Norman has drawn the following conclusions from the various opinions expressed by experienced military officers:—

1st. That the soldier is of the greatest value from twenty-five to thirty years of age.

2d. The age and length of service which produce the most valuable soldiers, may be taken from twenty-five to thirty, with three to eight years' Indian Service.

3d. That deterioration commences after thirty to thirty-five years.

What would be the best average age of a military force must be decided partly by past experience and partly on physiological grounds. Past experience goes to show that the average age should be from twenty-five up to thirty. Men of these ages have been found in the best condition to withstand the diseases and exigencies of climate and military service; and physiological considerations confirm these views, for the epiphyses are only in part, or not at all, united to the main parts of the bones, and the viscera, especially the heart and lungs of growing youths, are not fully developed; in short, the growth and consolidation of the frame are not completed till twenty-five years of age.

I think, myself, that a soldier who has had from two and one-half to three years' service, say in India, and is twenty-five years of age, is at his highest state of physical vigor for service in that country, and from twenty-five to thirty-five years of age for service generally in any country.

The greatest vital capacity or fullest measure of air is changed in the lungs, in an experimental respiratory act, at the age of thirty, according to Bourgery; it begins

to decline from thirty-five, according to Hutchinson; but the quantity of tidal air, (the inspired and expired air of each ordinary respiration) increases progressively with increasing years, more air requiring to be changed by reason of the steadily diminishing aerating surface.

Parenthetically I may remark that the English lexicographer, Dr. Johnson, in his well-known impromptu verses to Mrs. Thrale, on her 35th Birthday, expressed exactly the same idea in regard to this age:—

"Oft in danger, yet alive,
We are come to 35.
Long may better years arrive,
Better years than 35.
Could philosophy contrive
Life to stay at 35,
Time its wheels should never drive
O'er the bounds of 35.
. . . . . .
For howe'er we boast or thrive,
Life declines from 35."

The question of the relative value of old and young soldiers in relation to climate, as well as their power to endure fatigue and exposure in a campaign, forms a most important question for an imperial power like that of Great Britain; and its consideration involves several points of an essentially medical—that is physiological—character. The main elements of the problem are: given an insular power holding military sway over many and distant colonial possessions, the constitution of the country being inimical to conscription in any form, and where recruits must be taken young to be secured at all, how can we best maintain an army of adequate strength and efficient quality, with a reserve available in case of national necessity? To this problem must be added the preponderating consideration from the standpoint of the Indian Government, viz.: the military requirements of that country garrisoned by 60,000 or 70,000 British soldiers.

What is known as the short service system has the following advantages: it tends to procure a celibate army, thus relieving the State of the expense of barracks, etc., for married soldiers. Supposing a sufficient interval of time to elapse, its operation would secure a reserve on a system practically the reverse of that hitherto followed: for in our Crimean and pre-Crimean wars, the places of the veteran troops in the field, were taken by immature recruits from home; while now the places of the young troops in the field would be filled up by the older soldiers from the reserve.

On the other hand the disadvantages are: that the men composing an army are manifestly, on physiological grounds, not sufficiently matured to withstand the hardships and fatigue incidental to field-service; they have resiliency enough, but insufficient resistance; they are drilled, but not trained. The difficulty of getting non-commissioned officers of the right stamp and in requisite numbers, is increasingly great; the expense, so far as the invaliding of the sick and the transport of time-expired men are concerned, is also great; the composition of a corps is liable to frequently recurring fluctuations in consequence of men taking their discharge when their training is perfected, the weakening of discipline, organization and *esprit de corps* being entailed thereby, and the reserves may deteriorate or not become available when required.

As far as susceptibility to climatic diseases on the one hand, and inefficiency in the field from lack of power to withstand fatigue and hardship on the other, the young and unseasoned corps and soldiers of the present day, contrast unfavorably with the older and acclimatized corps. That was the result of our experience in Afghanistan. The soldier is, of course, subject to the same law as the inferior animals, viz.: that the

adult and matured, possess powers of endurance which the young and immature do not; and a soldier under 22 or 23 years of age is consequently relatively inefficient in the field.

It is necessary, however, to avoid exaggerating the effect of age on efficiency. It is a mistake to suppose that a soldier of over ten years' service is better than one of five; he frequently is not as good. In cheerfulness, prodigality of life, and resiliency, the younger man notoriously enjoys the advantage. His physical defect, as far as campaigning is concerned, is want of endurance; his frame and constitution require good food and periodical rest; for a short, or a series of short efforts, a young man is quite as capable as an older one, but in sustained effort or labor, and under privation, he is manifestly his inferior. For many obvious reasons older men are required for the non-commissioned ranks, and it is a State question, how such men are to be obtained. Physical and moral degeneration are allied, and commonly advance *pari passu*. Where the former exists, it is not, as a rule, counter-balanced by superiority either in intelligence or discipline. A corps with time-honored tradition of excellence will best maintain its name by a good supply of fresh physical energy.

It is the experience of all travelers, that change of climate is followed by a certain amount of change or disturbance in the physical health, sometimes of a favorable nature, sometimes the reverse, and frequently of an insignificant kind, but we are sensible of the change nevertheless. On the arrival of an immigrant in a new place, whether it agrees with him or not, his organism appreciates and probably manifests some difference until it is again in equilibrium; that is to say, until by a new adjustment, as it were, in the play of his animal mechanism to the new conditions, his constitution or system accommodates itself thereto.

From such small beginnings it is easy to trace our way up to their greater and more appreciable modifications, the outcome of which is embraced in the term Acclimatization.

Mr. Janie in his "Voyage aux Eaux des Pyrénées," when speaking of the Berne peasants, says: "The race moulds the individual, and the country moulds the race." A degree of heat in the atmosphere and of inclination in the soil is the primary cause of our faculties and passions.

Virchow, in his address before the Congress of German Naturalists and Physicians at Strasburg, on September 22d, 1885, forcibly calls the attention of doctors and naturalists to this sphere of research. He says: "Neither the French nor the English have as yet done anything important with reference to it. It is, then, a virgin field that falls to German science. It is, also, a subject of the highest importance, for we cannot think of even an approximative solution of the problem till we have gained a precise idea of the modification of the organism, and particularly of the special alterations of each organ connected with the phenomena of acclimatization."

But it may be fairly doubted whether the constitutional changes brought about by a residence extending over a few years in a foreign climate, can be rightly designated as "acclimatization;" they rather represent, it may be urged, a process of seasoning, as the seasoned soldier may be said to represent the survival of the fittest by the possession of superior physical qualities which resisted, rather than adapted his constitution to, the deteriorating influences of climatic changes.

Into the subject of race in relation to climate on the one hand, or into the physiological changes introduced in the individual by change of climate on the other, I do not propose to enter. I purpose limiting myself to showing what have been the results of our experience as to the increased susceptibility to disease or vulnerability of constitution, engendered by this unstable state of system, while it is accommodating itself to its new surroundings.

Short service, as it is called, when first introduced into the British Army comprised

6 years with the colors and 6 with the reserve. At the present time it is 7 years with the colors and 5 with the reserve; and, if the period of army service expires while the soldier is serving abroad, it comprises 8 years with the colors and 4 with the reserve. I would first of all call your attention to table A, which shows the comparative sickness, mortality, etc., of men who have extended their service in India and of those who have not, when stationed in the Bengal, Madras and Bombay Presidencies during the year 1885. The death rate of men with extended service is less than one-half that of the other, and the admission, invaliding and constantly sick rates, are also considerably lower.

The great influence of two factors—youth and recent arrival in a hot country—in regard to disease, and notably in regard to enteric fever, is well shown by tables A, B, and C, extracted from public documents. (See pp. 105, 106.)

This subject is a very important one from a statesman's as well as a public health point of view. The tables will serve as a guide in two respects: 1st, in forming an estimate of the amount of disease to be expected in a given force under certain conditions; and 2d, as to the necessity of exposing young and newly arrived soldiers as little as practicable to heat, hardship and improper food.

Our efforts in India have all been concentrated in one direction, viz.: to send as many of them as possible to the hills, and with manifest advantage.

Enteric fever—whether we regard it in relation to the mortality of causes, the long period of inefficiency which it entails on the soldier who is the subject of it, or the great loss to which the State is consequently subjected—is perhaps the most important of all the diseases making up the pathology of an Indian climate; for, it must be remembered that, while the ravages of cholera as an epidemic visitation are more fearful, enteric fever is a disease of annual recurrence, and it is circumscribed within the limits of no particular locality, but it may even be said to be conterminous with the presence of the European soldier; it is preëminently *the* disease of which the young soldier dies in India, and it is one, if not the chief source of sickness and inefficiency, in wellnigh every corps and battery disembarked at Bombay during its first and second years of service, notwithstanding that such troops may be distributed throughout the various stations of the three Presidencies.

The late Dr. Bryden, gathering up, as it were, the vast array of facts which his position as Statistical Officer with the Government of India commanded, has shown that out of 73 regiments and batteries which went to India between 1871 and 1877, nine only remained free from enteric fever in the first twelve months after landing.

Enteric fever has no geography; it is widespread, extending from the Rocky Mountains to the Himalayas; but it is especially the disease of warm climates. The prevalence of this fever in India, agrees so closely with the periods of greatest heat, that it is more than probable that the enteric fever and the heat maxima are connected with each other. The hot and cold seasons in India are the fatal seasons for the European and native troops respectively; the European dies of heat diseases, and the natives of those induced by cold. Especially is this noticeable in the native corps with a well marked history of malaria, for such corps are likely to become quite inefficient on service, from recurrences of ague and from the prevalence of fatal forms of pneumonia.

One of the most powerful predisposing causes to enteric fever, and one universally recognized, is age, the greatest predisposition being between 18 and 30, and diminishing in proportion to the distance of the age from these limits, *vide* table B, which shows the death rate per 1000 of the European army in India, from enteric fever at different ages.

It follows, therefore, that we are, under the short service system, carrying out what partakes of the nature of an experiment; for the European population in India consists

almost exclusively of individuals within the limits of the enteric fever age, and the result has been to demonstrate the truth of this law.

The liability to die from enteric fever, in the case of the soldier above 7 years' service in India, is 3.87 as contrasted with 82.44 in the young, and 13.69 in the class resident from 5 to 7 years, reckoning liability at 100.

The average expectation of life decreases everywhere, of course with increasing age; and with Europeans in tropical countries, deterioration of health and the death rate, rapidly increase after certain ages and prolonged residence in such climates: but the young soldier during his first year's service in a climate like that of India is as likely to die of enteric fever as of all the other diseases put together.

What is true of India has been found to be equally true in regard to our recent campaigns in Egypt and elsewhere; and our experience in this respect is very parallel with that obtained by the French in their expedition to Tunis, on the same littoral as Egypt.

In 1882 the troops that went to Egypt from England suffered greatly from enteric fever; but the Indian contingent, and the European regiments that formed part of that contingent, had an immunity from that fever, although subjected in all respects to the same conditions as the corps from Great Britain.

In 1884 an expedition, composed of troops that had garrisoned Egypt after Tel-el-Kebir, took place in Eastern Soudan, under Lieut.-General Sir Gerald Graham, G.C.M.G., K.C.B., Royal Engineers. These troops had no enteric fever, and their escape from it was ascribed to the use of condensed water; but in 1885, when a force, composed of regiments from England, was at Suakin, they suffered greatly from enteric fever, notwithstanding the fact that they were provided with condensed water.

The practical conclusion amounts to this, viz.: that this greatly increased susceptibility to enteric fever extends over about two years in a hot country, after which there is a relative—indeed it might almost be said, practically—an absolute immunity from attack. This is strikingly exhibited by table C (p. 106), which shows the death rate per 1000 from enteric fever of the European army of India at different periods of service.

It is a curious and noteworthy fact—into the causes of which, however, I cannot enter—that diseases of the liver, such as hepatic abscess, are relatively so common in the East and so rare in the West Indies.

Prior to the introduction of the short service system, a regiment during its tour of Indian service, lost, roughly speaking, 77 per cent. of its strength. This loss was made up as follows: deaths, 18 per cent.; invaliding, 28 per cent.; time expired, 16 per cent.; transfers, 12 per cent.; desertion, etc., 3 per cent.

A few words in conclusion: The changes in physical constitution undergone by Europeans passing from temperate to inter-tropical regions, may be assumed as beneficial adaptations to altered conditions: as steps toward acclimatization.

Foreigners in military occupation of countries whose mean temperatures exceed their own, up to nearly 20° Fahr., and where certain diseases are endemic, will no doubt have a higher death rate than the corresponding classes in their own land; but how much of the excess of mortality above what is inevitable, may be reduced by the improved habits of life of the immigrants, (personal hygiene), and by the application of sanitary laws, is shown by what has been already done in India, where the average annual death rate was 60 per 1000 for the thirty-nine years, 1817–55 ("Report of Commissioners to inquire into Sanitary State of Army in India"), whereas it is now 14 per 1000, and where the loss from cholera and the total losses from death and invaliding still show signs of diminishing, decade by decade.

DEBATE.

Surgeon MORSE K. TAYLOR, United States Army, speaking of the paper by Dr. Marston, on acclimatization of soldiers in reference to service, said:—

The paper just read is too important and valuable to be discussed in the few minutes allowed for this purpose. One or two points, however, are so salient as to require notice at this time. One of these is the gradual deterioration of the functions of the heart. My own investigations in the army of the United States tend to show that this deterioration of the heart is a comparatively frequent occurrence; and this has been proved by the examination of many hundreds of men who were on duty and in comparatively good health. This pathological condition is often masked by consecutive ailments, which, being more pronounced, mislead the surgeons as to the important part the feeble heart plays as a cause in diseases of the intestinal tract, the liver, and stomach.

Surgeon-Major G. T. LANGRIDGE, of the Medical Staff of the British Army, said that as a result of his experience, in the field and elsewhere, he fully concurred with Dept. Surg.-General Marston's observation as regards the superiority of the matured and seasoned soldier over the young one. He was forcibly struck by this fact during the late Afghan wars, when he was for some time in medical charge of the 92d Gordon Highlanders. This regiment was composed chiefly of men who had already spent many years in India; but there were also many young soldiers in the ranks. The vicissitudes of temperature and extent of fatigue to which this regiment was exposed afforded an excellent opportunity of comparing these two classes. Both on the march and in quarters, Surg.-Major Langridge was struck with the superiority of the matured soldier. The young soldier knocked up quickly under prolonged fatigue, besides being so much more liable to that fatal disease of young soldiers, viz.: enteric fever.

TABLE (A) SHOWING THE COMPARATIVE SICKNESS, MORTALITY AND INVALIDING OF MEN WHO HAVE EXTENDED THEIR SERVICE IN INDIA, AND THOSE WHO HAVE NOT, STATIONED IN THE BENGAL, MADRAS AND BOMBAY PRESIDENCIES DURING 1885.

| | Bengal. | | | | | Madras. | | | | | Bombay. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average Annual Strength. | Number Admitted into Hospital. | Died in and out of Hospital. | Invalided to England. | Average Number Constantly Sick. | Average Annual Strength. | Number Admitted into Hospital. | Died in and out of Hospital. | Invalided to England. | Average Number Constantly Sick. | Average Annual Strength. | Number Admitted into Hospital. | Died in and out of Hospital. | Invalided to England. | Average Number Constantly Sick. |
| Regimental, warrant and non-commissioned officers and men who have extended their service in India | 5,638 | 6,119 | 45 | 88 | 233.60 | 1,843 | 1,142 | 5 | 24 | 57.22 | 2 048 | 1,918 | 22 | 34 | 94.99 |
| Ratio per 1,000 of strength | ... | 1,085.3 | 7.90 | 15.61 | 41.43 | ... | 619.64 | 2.71 | 13 02 | 31.04 | ... | 936.52 | 10.74 | 16.60 | 46.38 |
| Regimental, warrant and non-commissioned officers and men whose service has not been extended | 26,073 | 48,746 | 397 | 626 | 2,257.80 | 8,571 | 10,963 | 92 | 227 | 628.80 | 8,206 | 13,389 | 218 | 305 | 626.90 |
| Ratio per 1,000 of strength | ... | 1,869.6 | 15.23 | 24.01 | 86.60 | ... | 1,279 08 | 10.73 | 26.48 | 73.36 | ... | 1,631.21 | 26.55 | 37.15 | 76.37 |
| Totals of both classes | 31,711 | 54,865 | 442 | 714 | 2,491.40 | 10,414 | 12,105 | 97 | 251 | 686.02 | 10,256 | 15,307 | 240 | 339 | 721.89 |
| Ratio per 1,000 of strength | ... | 1,730.2 | 13.94 | 22.52 | 78.57 | ... | 1,162.38 | 9.31 | 24.10 | 65.87 | ... | 1,492.49 | 23.40 | 33.05 | 70.38 |

TABLE (**B**) SHOWING THE DEATH RATE, PER 1,000, OF THE EUROPEAN ARMY IN INDIA, FROM ENTERIC FEVER, AT DIFFERENT AGES, FOR THE YEARS 1877–1884.

(*Taken from Report of Sanitary Commissioner with Government of India.*)

| Year. | Under 25. | From 25 to 29. | From 30 to 34. |
|---|---|---|---|
| 1877 | 2.45 | 1.55 | .99 |
| 1878 | 6.04 | 3.55 | 1.04 |
| 1879 | 6.17 | 2.73 | 1.78 |
| 1880 | 6.25 | 3.15 | 1.09 |
| 1881 | 4.56 | 1.57 | .79 |
| 1882 | 4.32 | 1.55 | .78 |
| 1883 | 4.34 | 1.50 | .70 |
| 1884 | 4.61 | 1.83 | ... |

TABLE (**C**) SHOWING THE DEATH RATE, PER 1,000, OF THE EUROPEAN ARMY OF INDIA, FROM ENTERIC FEVER, AT DIFFERENT PERIODS OF RESIDENCE IN THAT COUNTRY, FOR THE YEARS 1877–1884.

| Year. | 1st and 2d Years. | 3d to 6th Year. | 7th to 10th Year. |
|---|---|---|---|
| 1877 | 3.31 | 1.35 | .90 |
| 1878 | 7.90 | 2.64 | 1.38 |
| 1879 | 7.99 | 2.18 | 1.24 |
| 1880 | 9.08 | 1.78 | .47 |
| 1881 | 4.55 | 2.07 | .56 |
| 1882 | 4.68 | 1.93 | .34 |
| 1883 | 4.98 | 1.55 | .55 |
| 1884 | 5.47 | 1.55 | .46 |

TABLE (**D**) SHOWING HOW 100 DEATHS* ARE COMPOSED AT DIFFERENT PERIODS OF INDIAN SERVICE, AS DEDUCTED FROM THE MEDICAL HISTORY OF FOUR YEARS, 1873–1876. ARMY OF INDIA, 1873–1876.

| In First 4 Years. | | 5th, 6th and 7th Years. | | Above 7 Years. | |
|---|---|---|---|---|---|
| Enteric fever | 22.2 | Hepatitis | 18.9 | Heart disease | 16.2 |
| Hepatitis | 14.0 | Apoplexy | 11.9 | Hepatitis | 16.0 |
| Apoplexy | 11.8 | Heart disease | 11.2 | Dysentery | 13.3 |
| Phthisis | 9.0 | Dysentery | 10.1 | Apoplexy | 10.3 |
| Dysentery | 9.0 | Phthisis | 8.1 | Phthisis | 8.2 |
| Other fevers | 7.8 | Fevers | 7.3 | Respiratory diseases | 6.8 |
| Heart disease | 5.8 | Suicide | 6.1 | Fevers | 6.0 |
| Respiratory diseases, | 4.4 | Respiratory diseases, | 5.9 | Suicide | 5.2 |
| Suicidal deaths | 2.1 | Enteric fever | 5.2 | Enteric fever | .9 |
| All other diseases | 13.9 | All other diseases | 15.3 | All other diseases | 17.1 |

* Excluding cholera, smallpox and accidents.

TABLE (**E**) SHOWING THE LOSS FROM ALL CAUSES AND FROM DEATH AND INVALIDING IN 23 REGIMENTS AND BRIGADES OF ARTILLERY IN THE COURSE OF THEIR TOUR OF INDIAN SERVICE, WHICH OCCURRED AMONG THE MEN WHO CONSTITUTED THE REGIMENT OR BRIGADE ON ITS ARRIVAL IN INDIA.

| Years in India. | Strengths. | | | Causes of Loss. | | | | | | Loss per 1,000 of strength. | Loss per 1,000 from Different Causes. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Present on arrival in India. | Embarked for England. | To be accounted for. | Deaths. | Invaliding. | Time expired. | Purchased. | Transfers. | Removed for other reasons, or deserted. | | Deaths. | Invaliding. | Time expired. | Transfers. | Deserted or otherwise removed. |
| From 8 to 14 | 15,529 | 3,554 | 11,975 | 2,765 | 4,399 | 2,535 | 156 | 1,855 | 265 | 771.14 | 178.06 | 283.28 | 163.24 | 119.45 | 27.11 |

The above regiments left India between 1871 and 1876. The loss per cent. would now probably be much larger.

# ON HEAT STROKE IN INDIA.

## COUP DE SOLEIL DANS LES INDES.

## ÜBER HITZSCHLAG IN INDIEN.

BY JOHN ANDERSON, M. D., M. R. C. P. LONDON, M. R. C. S. EDINBURGH;

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I have read in several English newspapers, accounts of the recent prevalence of sun or heat stroke in America, and it has consequently occurred to me that a brief account of my experience in India, in this respect, might not be altogether devoid of interest to this Section of the International Medical Congress.

A great deal has been written on the subject, and I fear that I can contribute little or nothing to the elucidation of its pathology; indeed, one of your own physicians, Dr. H. C. Wood, of Philadelphia, has carried out an admirable experimental investigation into the effects of heat on the animal system.

If we exclude heat exhaustion, which is often and very erroneously classified as sun or heat stroke, for heat exhaustion is simply the result of exertion and fatigue in hot weather, where the sufferer falls down with a freely perspiring and cold skin, and where the phenomena of sun or heat stroke which I am about to describe, do not ensue, then I think the following division will embrace the various forms of the disease: 1st. Ardent Fever; 2d. Heat-Apoplexy; 3d. Sunstroke. Such a classification seems to me more fully in accordance with the deviation from the normal temperature of the blood; the effect varying not only in relation to the height of the temperature reached, but also in relation to the rapidity with which it is reached.

No description of any given disease or its varieties, can possess the clearness of outline of a photograph; the grouping of the varieties must be more or less arbitrary; but so long as it is conformable to nature, and recognizable in practical life, that is all that is required for the purposes of useful classification.

By *Ardent Fever* I mean a non-specific continued form of fever, of comparatively short duration, resulting from exposure to heat.

*Heat-Apoplexy* is a heat fever, with high temperature, contracted pupils, cyanosis, loss of consciousness, and a marked tendency to death by asphyxia. It more commonly results from the *indirect* effects of solar heat, or radiated heat, and usually occurs at night, in dwellings, or in crowded tents.

*Sunstroke* is a form of heat fever, with a very high temperature, contracted pupils, rapid loss of consciousness, and frequently attended with convulsions indicative of perverted action and exhaustion of the nerve centres.

Both in this and in heat-apoplexy there is marked cardiac debility and embarrassment, probably largely due to a paresis of the sympathetic heart centres.

In brief, it will be seen that all three of the foregoing are pathologically allied; they are, as it were, so many beads of different sizes and colors united on one and the same thread.

In ardent fever, we have commonly portal congestion and increased metabolism of the liver, plus the effect of heat on the nervous system.

In heat-apoplexy, we have a poisoned state of the blood, resulting from vitiated atmosphere, arrested secretions, with possibly the addition of alcohol, forming in combination the dominating factor; and heat, *not direct* solar, but *radiated* heat, as the subordinate, but determining factor.

In sunstroke we have the direct and dominating factor of solar heat, acting on the

cortices and meninges of the brain and spinal cord, plus, it may be, a toxæmia as a subordinate predisponent factor.

I would here refer for a moment to the two main sources of animal heat, viz.: the muscles, which are the chief source, and the glandular organs, which stand next in order of importance.

The muscles of an adult man, form nearly half of the whole body weight, and contain about one-quarter of his blood. From this, says Foster, "we infer that a large part of the metabolism of the body is carried on in the muscles." Now, as whenever a muscle contracts heat is given out, and as wherever metabolism is, there heat is generated, it is not difficult to realize what a seriously predisposing cause over-exertion is to this disease, over and above the nervous exhaustion resulting from fatigue.

Of the glandular organs the liver is by far the most important. It contains about a quarter of the whole blood of the body, and we know what extensive metabolism takes place in it. It is, therefore, clear that congestion of the portal system, induced by intemperance in food and drink, is also a powerful predisponent.

Then we have the regulators of the body heat. Of these the three principal are the skin, the lungs, and nervous system.

The skin is the most powerful; it regulates by means of conduction, radiation, and evaporation of perspiration from its surface. It is obvious that conduction and radiation can reduce the heat of the body but very feebly, when the surrounding media are as hot, if not hotter, than the body itself, and when the air is moist and still as well as hot, evaporation from the surface is reduced to a minimum.

In the grave forms of the disease, more particularly in heat-apoplexy, we have stertor and so engorged a condition of the lungs, that on section, post-mortem, the blood drips freely from the cut surfaces; hence we may assume that the heat-regulating power of these organs is seriously impaired.

Foster, in his work on physiology, shows how the vasomotor mechanism influences the regulation of the body heat. He tells us that a vasomotor action—which by constricting the cutaneous vascular areas, or by dilating the splanchnic vascular areas—causes a smaller blood flow through the skin and a larger one through the abdominal viscera, will tend to increase the heat of the body.

But Foster, while admitting that the influence of the nervous mechanism in animal heat—not only in maintaining the normal temperature, but also in affecting the variation of temperature in disease—can hardly be exaggerated, adds that much requires to be learned before its exact nature can be confidently spoken of.

I think, however, I have shown how the sources of heat are increased and the outlets blocked. From this we must have a rising body temperature, with heat stroke as the result, unless the supply be diminished, or the outlets opened.

And now, Gentlemen, I come to the treatment, and it is chiefly on account of a point that I wish to emphasize in this part of my subject, that I have ventured to take up your valuable time.

1st. Prophylactic measures, it is, perhaps, obvious, cannot be passed by unnoticed. People who live, and soldiers who serve in hot climates, cannot get rid of heat, but they can do much to modify it by living in well-ventilated rooms with a suitable proportion of cubic space and superficial area for each occupant. They can make the still air move by means of fans or punkahs. They can be temperate both in eating and in drinking; most particularly they can abstain from alcohol, or take it only sparingly and well diluted with water, for alcohol has a powerful deleterious influence, because, 1st, it increases portal congestion, and 2d, it has a great attraction for water. They can dress in garments that are light both in color and in weight and are loose enough to admit of the freest respiratory movements. Dr. Arnold Hiller, of the German Army, in a lecture he very recently delivered to the officers of his corps, laid great stress on the

importance of this point; indeed, he regards great heat alone, as a subordinate factor to the detention and accumulation of heat brought about by heavy clothing. He also relates some experiments showing the great value of perspiration and its increased effects when assisted by wind. When troops march in hot weather, the march should be made at night, or sufficiently early to be completed by 7 A.M. Urgent military necessity is the only good reason for neglecting this precaution. The ranks should be as open as possible, and care should be taken that the men's water bottles are filled before starting; cold tea, flavored with lime juice, is an excellent beverage for the purpose, for tea and coffee are good respiratory excitants and have none of the drawbacks of alcohol. The marches should not be too long, and food should be taken before starting and at halting places, as safeguards against fatigue.

In cases of simple ardent fever, the initial step in the treatment is to relieve the congested portal system by an aperient, and none is more suitable than a dose of calomel, gr. ij–iv, followed by such a saline as sulphate of magnesia. Cold sponging of the body, or the wet pack, lowers the temperature, refreshes the patient, and frequently induces sleep. Quinine in small doses, grs. ii–iij, is indicated, and in my experience, has proved efficacious. The bromides of potassium or ammonium are useful. In the Punjab and North-west Provinces of India I have often seen over twenty per cent. of the strength of recently arrived regiments, in hospital in the months of April, May and June, from this cause. Here I may incidentally remark, that at Peshawur we have two forms of fever, differentiated from each other by the seasons of their accession or prevalence. In April and May it is an ardent fever, short in duration and continuous in type, on which quinine exerts no specific influence, and it is the cause of much inefficiency. In brief, it is the ardent fever of which I am speaking. But in October and November we have a fever of an altogether different type, viz.: a malarial fever, varying in degree from a simple ague, to its most pernicious form—resembling cholera—in which quinine, arsenic and change of air are alone of any avail.

In the graver forms of heat stroke, much more active measures are urgently called for. My practice has been to strip the patient instantly; to lay him on an inclined plane by raising the head of his bed ten to fifteen inches from the ground; to place him, if possible, in a current of air, and failing that, to make attendants circulate the air around him by fans or hand punkahs. Douche him freely, but not suddenly, by pouring cold water in good volume over head, chest and abdomen, and the bowels should be quickly cleared by salt and water enema. None of these measures should be omitted; but what I am especially anxious to bring to your notice, is, the beneficial result I have obtained by the hypodermic use of quinine in these cases. As far as I am able to ascertain, this is not the general practice of English physicians, whatever it may be with those of this country. Sir Joseph Fayrer—in his able article in Quain's Dictionary of Medicine—incidentally remarks that this method of treatment has been "supposed to give good results by its influence on the vasomotor nerves and its power in retarding tissue change." And Dr. Roberts Bartholow, in his work on the practice of medicine, says: "The subcutaneous use of quinine may also be practiced to reduce heat." I venture to think, however, that in quinine so employed, we have a remedy of singular efficacy in such cases; at least it has proved so in my experience in many instances, and I believe its more general use would be attended by a much lower mortality than that now usually met with in the treatment of this disease.

I have seen patients in a state of coma from heat stroke, so far recover, in from ten to twenty minutes after the subcutaneous injection of quinine, as to be able to protrude the tongue when desired to do so, and to show by signs or speech that they understood a question put to them.

I have a clear recollection of having in one morning, when in cholera camp at Nian Nier, without a tree to shelter our tents from the fierce heat of a Punjab sun, in

July, treated fourteen cases of heat stroke, of such grave severity, that the patients were insensible, by the subcutaneous use of quinine, with a fatal result in only one instance.

The dose I use for injection is grs. ij–iv, and this may be repeated at such intervals as may be indicated by the condition of the patient. I have administered a second dose in half an hour after the first, and a third in two, three or four hours after the second. When we reflect how narrow is the line between life and death in these cases of hyper-pyrexia, and remember that with a body heat of even 107° F. there is still time to save life, but that at 111.2° F. death immediately ensues, it is everything to possess an agent which will control a few degrees of temperature in a few minutes. Gentlemen, I claim for the subcutaneous use of quinine in the treatment of heat stroke this property.

There are certain precautions that must be observed in this method of administering quinine :—

1st. The solution must be perfectly clear—it must be filtered, if necessary.

2d. The salt used must be one that is perfectly soluble in distilled water without the addition of any acid. Such a salt is the quininæ hydrobromas acida. This is a very soluble form; it dissolves 1–6 of water; it is richer in the alkaloid than the sulphate, and is quite unirritating. It is prepared by Mr. Martindale, of New Cavendish street, London. (Specimens of the salt and a solution handed to the President.)

Both of these precautions are essential in the hypodermic use of quinine. Some local irritation may follow the injection, and I have heard of two cases of tetanus that were alleged to have been caused by the operation. In my own practice, no such misadventure ever occurred, and I have used quinine subcutaneously many hundreds of times, for before I became acquainted with the advantages to be gained in treating heat stroke by this method, I had frequent recourse to it in the treatment of obstinate malarial fever, when quartered in such malarious districts as the Valley of Peshawur, in the North of the Punjab. The addition of morphia to the quinine solution, has been proposed as a safeguard, but I never found its use necessary, and of it I have no experience.

How quinine acts in the way I have described I cannot tell, but that it has a special effect on the nervous system, particularly on the cardiac ganglia and the vasomotor nerves, seems highly probable from the rapidity with which the effect follows the injection. I am aware that some eminent authorities—Professor Binz, for example—hold that quinine exercises some specific influence on the blood corpuscles ; still, I believe the explanation is rather to be found in its effect on the nervous system in this disease, as I have stated.

Since the date of my service in India, several new antipyretics have been introduced, and I understand that antipyrin, for example, has been used hypodermically in America in the treatment of heat stroke. I know that in the British Army both antipyrin and antifebrin have been employed in the treatment of ardent fever with very beneficial results, and their use in sunstroke will consequently be indicated.

## DEBATE.

In reference to Surgeon Anderson's paper, Deputy Surgeon General MARSTON dwelt upon the distinction between heat exhaustion, heat stroke, and heat apoplexy. He related some of his experience in India and Egypt, and specially called attention to the sequelæ of these affections—abnormal and erratic temperatures, insomnia, loss of nerve, acute neuralgic headaches and neuralgias, and occasionally, though rarely, short attacks of mania. The nerves of special sense are also sometimes affected. Although motor paralyses do occur, they are rare compared with the other forms of nerve lesion. Dr. Marston dwelt upon the importance of using a neutral, soluble, non-irritating form of quinine, as tetanus is very liable to occur

after slight punctured wounds and irritants in hot climates where there is great diurnal variation of temperature.

Deputy Inspector General W. H. LLOYD, of London, desired to confirm Dr. Anderson's views as to the efficacy of temperate living and good ventilation in dwelling places, as a prophylactic in the avoidance of heat apoplexy. Heat stroke is not ordinarily a frequent disease in the British Navy, but there is a yearly percentage of death from this cause, and ninety per cent. of these cases occur in the Red Sea, on ships passing through the excessively high temperature usual in this region at certain seasons. These cases are almost without exception in the persons of cooks, saloon stewards or bakers, and occasionally stokers; rarely is a blue jacket, or a man working on deck, a victim. The classes mentioned, generally spend much of their time in close, ill-ventilated, hot places, and are often addicted to unwholesome living and alcoholic excess. They are generally a flabby and etiolated class, and are rarely in a high condition of health.

Surgeon-Major LANGRIDGE, while in India, had some experience in the injection of the neutral sulphate of quinine. His cases were not those of sunstroke, but of very severe cases of remittent fever, accompanied by extreme high temperature. Ordinary remedies, including the administration of large doses of quinine internally, failed to reduce this to any extent. Hypodermic injections, three or four times daily, were then adopted, with great success; and in no case was there a more severe after-symptom than the occurrence of a slight local induration.

Surgeon M. K. TAYLOR, U. S. Army, said his experience in the military service was to the effect that the symptoms detailed by Dr. Marston were nearly always associated with heart failure.

Prof. E. A. WOOD, M. D., of Pittsburgh, Pennsylvania, said:—

I desire to speak very briefly on one or two features connected with thermic fever. While the different pathological conditions of sunstroke are important, yet the all-important pathological fact to be considered is the exalted temperature. We find a weak circulation; stimulants will not strengthen it; convulsions, hypodermic injections of morphia may arrest them; a stomach loaded with indigested food; a stomach-pump will empty that stomach, and enema may empty the bowels; and yet, when all these things are done, the patient is still unconscious because the great and all-important factor is still there—the rapid oxidation of the tissues, as measured by the thermometer. Now, if we begin at the other end, and succeed in reducing the temperature to near its normal standard, neurotic conditions, debility, unconsciousness and indigestion rapidly right themselves.

The all-absorbing consideration in cases of sunstroke is to reduce the abnormally high temperature, and until that is accomplished no other matter is worth regarding. This must be done quickly if we wish first, to save life, and second, to prevent unpleasant and lasting consequences to the nervous centres. Common sense would naturally turn to the external application of cold, and that treatment has become universal. Every stitch of clothing should be removed, cold water dashed over the body, ice applied, even ice in the rectum, and one or two should vigorously apply fans, to cause greater coldness by rapid evaporation. I am partial to one single hypodermic injection of 15 grs. of antifebrin. It is more rapid and more intense in its effects than quinine.

Dr. T. H. SHERWOOD, Medical Examiner U. S. Pension Bureau at Washington, said: In connection with this subject I wish to call the attention of those who

have an opportunity of observing, to the after history of these cases of so-called sunstroke.

My experience in the army during our late civil war, leads me to the conclusion that genuine cases of coup de soleil, or heat stroke, in which the cerebro-spinal nerve centres are involved, are extremely rare, and that the majority of these cases which have gone upon our army record as sunstroke, are simply cases of heat exhaustion in which the heart is mainly involved.

During the long and exhaustive marches of the peninsular campaign under McClellan, in the seven days' fight in front of Richmond, and in the later campaign of Gettysburg, when our troops were hurried along at a rapid rate, thirty-five and forty miles a day, I do not recall one single case of genuine heat apoplexy. Soldiers would fall out of the ranks, exhausted, in an apparent faint, with feeble and rapid pulse, pale, moist skin; but after administering restoratives and allowing them to ride in the ambulance for a time, would rejoin the ranks fully restored.

I have since had the opportunity in the Pension Bureau, with which I am connected, of studying the after history of these cases, and in the great majority of them have found that the heart is involved, and that we have hypertrophy, dilatation and sometimes valvular disease.

The main object of my remarks, however, is to direct attention to the after history of these cases, since our pension records are full of applications for pension based on disabilities attributed to "sunstroke," and we have such grave diseases as insanity, epilepsy, locomotor ataxia and paralysis agitans, attributed to this cause.

It will be seen, therefore, that it is a matter of great importance with those who have the making up of the army records, that the diagnosis be accurate, and that the after history of those cases which recover from the primary lesion, should be closely watched and accurately recorded.

Dr. James Collins, of Philadelphia, Pa., said he desired to call the attention of the Section to the occipital headache which continues at intervals, as evidence of the effects of heat fever, and he thought others must have noticed the symptom, although it had not been specially alluded to. He also desired to call attention to the use of the bi-muriate of quinia and urea, as an efficient neutral salt for hypodermic injections in cases when the reduction of temperature was required.

Dr. H. Earnest Goodman, of Philadelphia, late surgeon U. S. Vols., said: I had a long experience in the army, during the late war, of cases called sunstroke, and do not recall a pure case of sunstroke with high temperature, but I attributed the trouble to heart failure, and they usually recovered after a few hours and returned to duty. These cases of sunstroke since the war, have applied for pension and I have examined upward of 60,000 applicants for pension, among whom were many cases of alleged sunstroke. The symptoms are obscure pain in the head, inability to stand exertion or the sun, and loss of pluck. Examination of these cases almost invariably shows a hurt at base or apex of heart, and their history has almost invariably confirmed me in the opinion, that heart disease was the cause of most of the alleged sunstroke during the war.

Dr. M. Stern, of Philadelphia, said: I question Dr. Anderson's statement that all cases showing a temperature of 111° need necessarily be fatal. Dr. Austin Flint, Sr., of New York, reported a case in which, the temperature being over 111°, as a *dernier ressort*, he practiced bloodletting and the patient recovered. In Philadelphia, during the past two years, Dr. J. M. DaCosta introduced the method of treating patients suffering with coup de soleil, in tents, having the sufferers irrigated with iced

water and kneaded with lumps of ice. A prompt reduction of temperature usually ensues, and patients have recovered under this mode of treatment who were formerly looked upon as being hopeless. Of course, all other symptoms which may be alleviated are promptly attended to. The result is that the percentage of recoveries has largely increased since the introduction of the present system of procedure.

Dr. ANDERSON, in closing the debate, said: With your permission, Mr. President, I should like to say, in reply to Dr. Wood's remarks, that I regard it as a matter of course that no means of reducing body heat, such as ice and cold affusion, should be neglected; but I especially drew attention to the subcutaneous use of quinine because it is both the most powerful and most rapid agent for this purpose with which I am acquainted.

To antipyrin and antifebrin I have referred but very briefly, because I have no experience of these agents in these cases.

Referring to the blood-letting mentioned by another speaker, I may remark that such practice was at one time very general in India, and the resulting mortality was so great that it was given up.

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## DE L'ACCLIMATATION DES EUROPÉENS DANS LES PAYS CHAUDS.

### ACCLIMATION OF EUROPEANS IN HOT CLIMATES.

### ÜBER ACCLIMATISATION DER EUROPÄER IN HEISSEN LÄNDERN.

Rapport présenté au Congrès de Vienne, par Dr. TREILLE. Lu par le Dr. LEFEBVRE à Washington.

MESSIEURS:—La coïncidence du Congrès d'Hygiène de Vienne sur le Congrès de Washington, en retenant en Europe les représentants les plus éminents du Corps de Santé de la Marine Française, M. le Dr Gesten, directeur du Service de Santé à Paris, et M. le Dr G. Treille, médecin professeur et rédacteur en chef des Actions de Médecine Navale, me procure la bonne fortune de représenter le Corps de Santé de la Marine Française auprès de nos éminents et sympathiques confrères américains. Je ne veux pas abuser de vos instants, et après tant de savantes et intéressantes communications des médecins et chirurgiens de l'armée et de la marine des États-Unis, je ne vous demanderai la permission que de vous lire le résumé d'un travail que le Dr Treille présente à Vienne sur l'acclimatement des Européens dans les pays chauds. Dans la période actuelle d'expansion coloniale de tous les peuples, il est utile de connaître les règles d'hygiène précises qui doivent présider à ce mouvement d'immigration d'habitants de la zone froide et tempérée dans des climats torrides. Vous, messieurs, qui avez l'heureuse chance de posséder sur votre vaste territoire les climats les plus extrêmes, vous êtes plus à même que nous, de résoudre le problème de l'acclimatement.

Il y a une seconde question qui sera traitée à Vienne et qui doit marquer un nouveau progrès. C'est le procédé le meilleur pour la ventilation de tous les navires de guerre ou de commerce, principalement parmi ces derniers ceux qui sont chargés en grenier. Le Dr Treille pense qu'il serait utile d'avoir à bord de tout navire une force motrice destinée à refouler l'air extérieur dans toutes les parties du vaisseau par un

système de tubes canalisés. On protégerait les orifices en contact avec la cargaison par une toile métallique, destinée à empêcher l'obstruction des conduits par la cargaison, blé, matières textiles, marchandises, etc., etc. Le système actuel de manches à vent est absolument insuffisant. Il s'agit également de savoir comment avec la multiplication des cloisons étanches adoptées sur presque tous les nouveaux navires, il sera possible d'aérer suffisamment nos navires et de ne pas sacrifier absolument l'hygiène à une sécurité relative.

Je vous remercie d'avance de votre indulgente attention et de votre gracieux et sympathique accueil, en vous demandant la permission de glisser dans les remarquables rapports que j'ai entendus, tous les faits qui intéressent le Service de Santé de la Marine.

Je donne lecture du résumé du travail du Dr Treille.

PREMIÈRE PARTIE.—Elle comprend l'étude des modificateurs biologiques : chaleur, humidité. Ce sont les deux éléments constituants des climats intertropicaux dont l'action, sur l'organisme de l'Européen, est le plus accusée. Mais, c'est surtout l'humidité absolue, c'est-à-dire la tension de la vapeur d'eau dans l'atmosphère, qui joue le rôle le plus important.

Un homme qui vit dans un climat tempéré, a une exhalation d'eau pulmonaire et une évaporation cutanée, en rapport avec la tension annuelle moyenne de son milieu ordinaire.

La tension de la vapeur d'eau dans les vésicules pulmonaires, est d'environ 40 millimètres de mercure. Si la tension moyenne de la vapeur d'eau atmosphérique, oscille entre 8 et 10 millimètres (comme c'est le cas en Bretagne par exemple, et dans le Nord de la France), l'habitant de ce dernier climat, disposera donc d'une tension intra-pulmonaire en excès de 30 millimètres sur celle ambiante : il pourra donc exhaler librement la vapeur d'eau pulmonaire. Il est adapté pour cette fonction. Mais si cet habitant se rend sous les tropiques, qu'arrive-t-il? Là, il trouve autour de lui, dans l'atmosphère, une tension de vapeur d'eau considérable : double, quelquefois triple de celle qui existait dans son pays d'origine. Donc, sa puissance d'exhalation d'eau pulmonaire va diminuer, puisque la tension de cette dernière ne change pas. Par conséquent la partie séreuse du sang tendra à s'accroitre.

La fonction sudorale, il est vrai, est suractivée. Mais il faut tenir compte de l'accroissement considérable de la ration de liquide ingérée en boissons.

Or, comme cette ration, doublée, triplée aux pays chauds, ne peut être emportée soit par les sueurs, soit par les urines (et encore celles-ci diminuent aux pays chauds), sans avoir momentanément passé par le système porte et ensuite par la circulation générale, il en résulte qu'en fin de compte, la rétention d'eau pulmonaire et l'absorption exagérée de boissons, concourent ensemble pour élever la masse générale du sérum sanguin.

De là trois phénomènes :—

1re Augmentation de pression dans le système porte ; préparation morbide aux congestions du foie.

2de Augmentation du volume du sang dans la circulation générale, caractérisée par la pléthore vasculaire, la dilatation des réseaux, (veinosité cutanée, viscérale, hydrémie, des auteurs anciens) ; accélération et amplitude du pouls au début de l'acclimatation.

3me Tendance à l'anémie par rupture du rapport entre les globules et le sérum (anémie séreuse).

Enfin, malgré la suractivité de la fonction sudorale, l'élévation de la tension de vapeur d'eau dans l'atmosphère des pays para-équatoriaux, s'oppose à une évaporation complète des sueurs secrétées. Souvent même le pouvoir évaporatoire tombe au minimum, les sueurs perlent en gouttelettes innombrables sur le corps, elles coulent le long des téguments. Dès lors le refroidissement du corps s'opère mal, et il y a tendance

réelle à l'hyperthermie. (La température de l'Européen sous les tropiques, au début du séjour, est plus élevée d'environ ½ degré centigrade. Davy, Rattray, Jousset, médecins de la marine.)

D'autre part, la sur-activité de la circulation hépatique et l'augmentation de la masse aqueuse du sang, pousse à la polycholie. Le syndrome bilieux se montre dans la plupart des états morbides aux pays chauds.

En résumé, l'auteur pose les conclusions suivantes :—

1. Plus la vapeur d'eau a une tension forte et occupe une part importante dans la pression barométrique totale, et plus s'abaisse la tension propre de l'air sec, et, par suite, de l'oxygène : conséquence, anémie tropicale.

2. L'exhalation pulmonaire et le pouvoir vaporisateur cutané baissent concurrement aux pays chauds ; d'où accroissement de la masse séreuse du sang, pléthore séreuse, hydrémie, rétention du calorique et tendance à l'hyperthermie morbide.

3. L'augmentation de la pression générale, qui a lieu chez l'Européen, dans les premiers mois de son séjour sous les tropiques, notamment pendant l'hivernage, détermine de la dilatation veineuse, de l'engorgement des viscères abdominaux, de la polycholie, quelquefois des flux intestinaux.

4. Enfin, sous l'influence des sueurs exagérées deux phénomènes se produisent ; (A) le chlorure de sodium s'élimine par la peau en plus grande proportion, l'acide chlorhydrique diminue dans le suc gastrique, et celui-ci devient insuffisant ; (B) d'autre part, sous l'influence des abus de liquides ingérés, la paroi musculaire de l'estomac s'émousse, se laisse distendre ; ces deux circonstances combinées déterminent de la dyspepsie gastro-intestinale.

Deuxième Partie.—Elle s'appuie sur les conclusions de la première.

Il faut favoriser (1) l'exhalation pulmonaire ; (2) l'évaporation cutanée.

Donc il faut aux pays chauds.

1. Rechercher les altitudes où la tension de vapeur d'eau atmosphérique est moindre.

2. Choisir pour bâtir, un terrain rocheux (primitif de préférence), à plan toujours incliné, bien drainé, ventilé, défendu contre les marais, s'il en existe.

3. Entourer les assises de la maison d'un lit bétonné, imperméable, limité par une area destinée à recueillir et à emporter par des canaux déclifs, l'eau des pluies ou du sol.

4. Les murs doivent être à double paroi, à circulation d'air intérieur, permettant de ne laisser ainsi dans les pièces qu'un air déjà dépouillé d'eau par condensation sur les murailles.

5. La maison doit être à un étage sur rez-de-chaussée, peu élevée, bien étanche. Elle doit être entourée d'une large vérandah interceptant les rayons solaires. Il faut un double toit avec grenier.

*6. Les pièces d'habitation doivent cuber au moins cent mètres ; être bien ventilées, carrelées et plafonnées, pour ne donner asile à aucun insecte nuisible.

7. Toutes les servitudes doivent être séparées de la maison ; pas de fonds fixes, mais plutôt des tinettes mobiles, avec désinfection et évacuation quotidienne, autant que possible.

8. L'alimentation et l'habillement doivent être basés sur la nécessité de réduire au minimum nécessaire, la ration de liquides, et de faciliter d'autre part l'évaporation cutanée.

9. Les occupations de l'Européen dans les pays inter-tropicaux, et surtout équatoriaux, doivent être réglées de telle manière, qu'il ne s'expose pas au soleil entre 11 heures du matin et 3½ de l'après midi, et qu'en aucun cas il soit soumis aux travaux de culture du sol. Le rôle de l'Européen immigré aux pays chauds, doit être de diriger, de gérer, et non de faire par ses propres mains une exploitation agricole, pour laquelle il ne pourrait avoir une résistance physiologique suffisante.

# IS IT DESIRABLE THAT EACH SOLDIER IN TIME OF WAR SHOULD PERSONALLY CARRY A FIRST FIELD DRESSING FOR A WOUND? IF SO, IS IT ADVISABLE THAT A PRELIMINARY WOUND DRESSING SHOULD FORM PART OF THE EQUIPMENT OF EVERY SOLDIER ON TAKING THE FIELD? OF WHAT SHALL IT CONSIST, AND IN WHAT PART OF THE SOLDIER'S EQUIPMENT SHOULD IT BE CARRIED?

—

EST-IL À DÉSIRER QUE CHAQUE SOLDAT EN CAMPAGNE PORTE SUR LUI UN PANSEMENT PRÉLIMINAIRE? S'IL EN EST AINSI, SERAIT-IL BON QU'UN PANSEMENT PRÉLIMINAIRE FASSE PARTIE DE L'ÉQUIPEMENT DE CHAQUE SOLDAT EN CAMPAGNE? EN QUOI CONSISTERA CE PANSEMENT ET DANS QUELLE PARTIE DE L'ÉQUIPEMENT SERA-T-IL PORTÉ?

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IST ES WÜNSCHENSWERTH DASS EIN JEDER SOLDAT IM KRIEGE EINEN ERSTEN FELDVERBAND FÜR WUNDEN BEI SICH TRÄGT? UND WENN DIES DER FALL, IST ES RATHSAM, DASS EIN VORLÄUFIGER WUNDVERBAND EINEN THEIL DER AUSRÜSTUNG EINES JEDEN SOLDATEN BEIM AUSRÜCKEN IN'S FELD BILDET? WORIN SOLL ER BESTEHEN UND IN WELCHEM AUSRÜSTUNGSSTÜCKE SOLL ER GETRAGEN WERDEN?

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BY SIR THOMAS LONGMORE, C. B., R. P., F. R. C. S. ENGLAND;

Officer of the Legion of Honor; Professor of Military Surgery, Army Medical School, Royal Victoria Hospital, Netley, England.

The custom of issuing a "First Field Dressing" to soldiers in active service, so that no soldier, if wounded, should be without the means of a provisional dressing for his wound, originated in the British Army in 1855, during the Crimean War, and since that date, dressings of a similar nature have been issued to the troops on all occasions when a British force has been employed against an enemy in the field. Soldiers' "First Field Dressings" have also been more or less used in continental armies since that date, and they form, at the present time, one of the regular articles of field equipment of soldiers of the German Army. Questions regarding the materials most suitable for composing the "First Field Dressing," or "Soldiers' Packet," as it is frequently called on the continent, have been largely discussed, and various forms of the packet, and kinds of contents, have been devised and advocated by eminent continental surgeons on different occasions.

During the last three or four years, doubts have been strongly expressed in several quarters regarding the advisability of issuing "First Field Dressings" to soldiers at all, and some eminent surgeons, as General Arzt, Dr. Roth, of Dresden, and Dr. Gori, Lector on Military Surgery in the University of Amsterdam, have urged various objections to their distribution among them. Staff-Surgeon Dr. Rochs, of the German army, in an important article in Langenbeck's *Archiv für Klin. Chir.* (1885, 32d Band, 4th Part) writes that the necessity of First Field Dressings is open to discussion; and an eminent French Army Surgeon, 1st Class Médecin, Major E. Delorme, Professeur Agregè Libre at the Val-de-Grâce, Paris, in a special article "On the Antiseptic Packet of the Soldier, and its Utility," published in the *Archives de Médecine Militaires* (January, 1885), concludes, that it is not a thing applicable to a field of battle; while, at the sitting of the French Surgical Congress at Paris, on the 9th of April, 1885, he declared his conviction that if it were officially introduced into the French army, he would regard it as a useless incumbrance for the soldier, and its adoption as a dead loss to the State. ("Pour le soldat une surcharge inutile, et son adoption, pour l'Etat, une perte sèche.")

There are, however, on the other hand, military surgeons of eminence who still regard the Soldiers' First Field Dressing Packets as very valuable articles of field surgical

equipment, and it therefore seems desirable that the following points regarding them should be discussed, and, if possible, settled, for future guidance:—

(1) Do the needs—the experience of which led to the first institution of Soldiers' Dressing Packets—still exist, or not?

(2) Are the doubts which circumstances have led some surgeons to entertain regarding the expediency of First Field Dressings being carried by soldiers, based on solid grounds?

(3) If the preponderating advantages of each soldier carrying a First Field Dressing can be established, are there any drawbacks which have been met with in practice, that can be lessened or removed?

I propose to glance at the three points I have just mentioned. I do not think it necessary to say much regarding the necessity of a preliminary dressing of wounds in the field. Those who object to the issue of First Field Dressings to soldiers, fully acknowledge the need of some preliminary dressings being applied to wounds in the field, before the patients are admitted into the field hospitals, which are often unavoidably situated at very long distances from the places of conflict. The principal objects of primary dressings in the field, may be summarized as being, firstly, to protect such wounds—as are free from active hemorrhage and in a suitable condition for their application—from dirt and other sources of infection; secondly, to guard the injured parts from further injury, by affording appropriate support to them until the wounded men can be admitted into a hospital, where their wounds may be safely examined and definitely treated; and thirdly, to comply with the instinctive desire felt by most men, that parts which have been sundered and exposed by violence, should be covered by some suitable substitute for the integuments which have been divided.

As regards the needs, the experience of which led to the institution of Soldiers' First Field Dressing Packets, they are sufficiently indicated by the terms of the War Office Circular of May the 27th, 1855, which announced their introduction among the articles of field surgical equipment. The terms were: "The Secretary of State for War has decided that a Field Dressing shall form a component part of every British soldier's kit, on active service, so as to be available, at all times and in all places, as a first dressing for wounds." Experience had shown that on numerous occasions, and under various circumstances of ordinary occurrence in the operations and movements of warfare, the materials for primary dressings to wounds were not forthcoming when and where they were required, notwithstanding the regular provision made for the purpose. Every one will admit that the stores of surgical materials provided in all armies for the wounded, by their respective military regulations, are abundant in quantity, and that the manner in which they are arranged and disposed at the present day, in the regimental, bearer, company and field hospital sections of surgical equipment, is the best that can be devised for meeting the general wants that may be expected to result from hostile engagements, whether small or large; but, at the same time, no one who is acquainted with the ordinary events of campaigning, and especially with the particular occurrences that attend great battles, can help being aware how constantly it happens that wounded men are separated by long distances from the supplies which have just been mentioned. It is this constantly recurring separation from the regular establishments, that, notwithstanding all the improvements which have been made in the modes of distributing the surgical supplies for field service, gives rise to the necessity of insuring, by a special provision, that primary wound dressings shall be available at all times and in all places, just as much now, as the same cause did at the time of the Crimean War; and I do not know any means by which this can be accomplished, except by the soldier carrying on his own person the materials with which a wound can be dressed.

Some surgeons have objected to the supply of Dressing Packets to soldiers, on account of the completeness of the provision now made for Dressing Stations, and, undoubtedly,

if there were any reasonable ground for expecting the wounded to be brought sufficiently quickly to these stations, the objection would have great force. But, looking at the vast extent of ground over which many modern battles have been fought, the manner in which the wounded have been scattered, frequently in thickets, ditches, and sometimes in places difficult of access, and remembering the difficulties of transport, together with the long distances at which the appointed dressing stations, as well as the field hospitals, have often been situated away from the ground on which the actions have been fought, we know that the wounded cannot be brought with the regularity or speed desirable, to these stations of surgical help. Other surgeons have disapproved of the issue of Field Dressings to the troops, because, in certain instances where the dressings have been required, they have not been forthcoming, the soldiers having used them for other purposes. This experience has been chiefly derived from German soldiers, who, not ordinarily wearing knitted socks, have found the triangular bandages convenient substitutes for the linen foot coverings usually worn by them in marching, instead of the socks worn by soldiers of other armies. But a misappropriation, such as this, of an article supplied for a specific purpose, can certainly be prevented in various ways, among men subject to military discipline, and, as a fact, it has now been obviated in the German Army, by the Dressing Packet being stitched in a certain part of the soldier's tunic, the unstitching of which would render him subject to punishment, unless it were done for a legitimate purpose. Another argument that has been advanced against the supply of Soldiers' Dressing Packets is, that, although they might actually be with the wounded soldiers, they could not be used by them under the conditions in which soldiers are placed in the strife and confusion of an action. It is true that the most urgent desire of a wounded soldier is to get away from the area of conflict, and that under ordinary circumstances, no dressing can be applied while the soldier remains on the ground where the fighting is in progress; but when once he is clear of the mêlée, his next desire is that his wound shall have some sort of dressing applied to it. It is at this time that the First Field Dressing may be turned to useful account. I ascertained from a large number of the men who were wounded at Tel-el-Kebir, in 1852, that after the Egyptians had been driven from their position, and while the wounded were still lying near the works, the First Field Dressings were applied in numerous instances, either by the wounded men themselves or by their wounded comrades, or by the bearers when they came to carry them away, if their wounds were still undressed. In many instances of wounds of a slight nature, the first field dressings thus applied were regarded at the dressing station as a sufficient application, and the men retained them until they reached the hospitals, where definite treatment could be more conveniently adopted.

It is undoubtedly undesirable to encumber a soldier on active service with any weight that can be avoided, even a weight of two or three ounces, unless the preponderating advantages of the article that entails the additional weight are manifest, for every such addition proportionately lessens the carrying power of the soldier for ammunition. The additional cost to the Government, too, minute as it is in the unit, but considerable in the aggregate when multiplied by the number of troops to whom the dressings will have to be issued, must also be reckoned in the account. When, however, all these matters have been taken into full consideration, and not forgetting that among a large body of troops who may be engaged with the enemy, only a limited portion of them are likely to require dressings for wounds, the assurance that whatever the number of wounds may be, there shall be with the wounds the means of applying a primary dressing to each of them, and the beneficial moral influence of this assurance among the troops themselves, cause the practice of issuing Soldiers' First Field Dressing Packets to be one that can hardly be abandoned without serious disadvantage. At the same time, in order that the full benefit of this issue may be attained, it is essential that special places should be assigned to them in the uniforms of the soldiers—not

carried, as they have often been carried, in their knapsacks, haversacks, or valises, and that the positions in which they are placed should be made thoroughly known to every one concerned in their application. This arrangement was carried out in the Ashantee War of 1873-74, but it has not been on other occasions, and this drawback has prevented them from being turned to full advantage. Their particular position in the soldier's dress does not seem to be a matter surgeons need concern themselves about so long as the packets can be easily got at when required; the essential points are, that fixed positions should be assigned to them, and that the positions should be generally known.

I do not propose to enlarge upon the composition or arrangement of First Field Dressing Packets. I believe it to be essentially important that they should fulfill the following eight conditions, but so long as they have the qualities enumerated, I do not think it matters what the nature of their contents, or general form may be.

The conditions and qualities I refer to, are the following:—

1. The dressings in the packet should possess antiseptic qualities.

2. The packets should be capable of being stored, without deterioration, for three or four years.

3. The contents should be simple in their nature, should be capable of being quickly and easily applied when required to be used, and should be suitable for being left in wounds, without hazard, for a day or two, in case of need.

4. The dressings should be suited for use either with bullet wounds, or ragged shell wounds.

5. The packets should be cheap in cost.

6. Their contents should be protected against the effects of dirt, grit, and damp from outside, as well as from evaporation from within.

7. The contents should at least comprise (*a*) two pads, so that a wound of exit—if there be one—may be covered, as well as the wound of entrance; (*b*) a piece of bandage to secure the pads and support the injured parts, together with means of fastening the same; and (*c*) a triangular bandage, to be used either as a cover for the dressing or as an arm sling, or as a help in securing splints, or substitutes for splints, in cases of compound fracture.

8. The whole packet should be of a suitable size and shape for being carried in a part of the soldier's uniform, the portion of which should be settled by proper military authority; it should be readily got at, in any position of a soldier, and should not give rise to inconvenience from undue pressure; it should not stain the soldier's clothing, and it should not emit an odor that is likely to be so offensive to him as to induce him to rid himself of it without due cause.

I have forwarded for observation, by post (15th August), a specimen of the First Field Dressing Packets which were supplied to the troops during the expedition to the Soudan, Egypt, in 1884-85.* It was exposed to the heat of the Soudan climate during the period of the hostilities, and has not been opened since it was brought back to England. Some specimens that had been similarly exposed, were opened two years after the date of their issue, and were found to have retained at that time their antiseptic qualities; whether the contents of the specimen now sent still retain their antiseptic character, can only be ascertained by examination. A list of the contents and the composition of the packet, were inscribed on the outside of the cover of the original pattern, so that they might be known without opening it; but the manufacturers, in making the supply, printed their names upon it instead. The contents are—

(*a*) Two pads of carbolized tow in carbolized gauze, each 4″ x 3″ x $\frac{1}{8}$″.

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* This packet was sent to the Museum of the Surgeon General of the U. S. Army.—Ed.

(*b*) A carbolized gauze bandage, 2 yards long by 4″ broad, with one safety-pin.

(*c*) One triangular bandage of unbleached calico, rendered antiseptic by perchloride of mercury solution ; base 48″, two sides, each 34″ ; folded and fastened together by four pins.

(*d*) Tin foil, 7½″ x 10″.

(*e*) Cover of parchment paper, secured by flour paste impregnated with ½% of perchloride of mercury.

Remarks on the separate articles just enumerated have been already published on page 301 of the 25th volume of Army Medical Department Reports, London, 1885, and need not be repeated on the present occasion.

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# THE ANTISEPTIC TREATMENT OF WOUNDS IN WAR.

## DU TRAITEMENT ANTISEPTIQUE DES BLESSURES DANS LA GUERRE.

## ÜBER ANTISEPTISCHE WUNDBEHANDLUNG IM KRIEGE.

BY DR. M. W. C. GORI,

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MR. PRESIDENT AND GENTLEMEN : The application of antiseptic surgery in war has already a history, to which Surgeon General Sir Thomas Longmore and Professor Esmarch, from Kiel, Bergmann and Reyer, Surgeon General Dr. Cammerer, Mosetig von Moorhof, Baron Mundy, and many others, have largely contributed. That history can speak on every page, of constant and great progress. Only compare Lister's suggestions for the practice of antiseptic surgery in the field, published in the *British Medical Journal*, September 3d, 1870, with those in his address at the Woolwich meeting, in the same journal, February 23d, 1884. In 1870 he suggested "that the wound, as soon as possible after the injury, should be thoroughly washed out with 1–20 carbolic lotion, introducing the fluid by means of a syringe and manipulating the parts freely, so as to cause the lotion to penetrate into all the interstices of the wound, and at the same time squeeze out such clots of blood as it may contain. The fluid should be introduced repeatedly, to insure its thorough penetration ;" while on the subsequent occasion referred to, he said : "It is essential that all the surgeons concerned in the treatment of wounded men should be imbued with the idea of the importance of antiseptic principles. In civil practice we may go to any amount of expense, almost, in our materials ; we may have our materials as bulky as we please ; but in military practice it is, I conceive, essential that the materials should be cheap, and that they should be, so far as the first treatment of the wounded men is concerned, capable of being employed in small bulk. What should be done in the first instance should be simply the covering up of the wound with some antiseptic material and as little fingering as possible."

Already, three years before that time, I had the honor to speak, in the Section for Military Surgery and Medicine, at the International Medical Congress held in London, on the same subject, the following words : "It is true that most of the questions as to whether asepticism can be applied on fields of battle must be decided by experience ; but to establish how much of antiseptic apparatus may be omitted without danger, is a

question to be solved in time of peace. Two principles are predominant: (1) To touch the wounds with nothing but aseptics; (2) To cover them as soon as possible with antiseptic material. The covering of the wounds as a preparation to transportation, is the most important part of first dressings under all circumstances."

On the same occasion Esmarch has rightly said: "'The question where to begin with antiseptic treatment in field practice, is a question of principle. On the battle field a general antiseptic treatment is impossible and a paramount principle ought to be laid down, 'non nolere.' The experience of our Russian colleagues has verified my opinion, that a very great number even of the most severe gunshot wounds remain aseptic, if not touched or examined by dirty fingers or instruments. Every insufficient trial of rendering wounds aseptic on the field of battle, as well as examination of any kind, ought to be omitted; the wounds should only be sheltered from the obnoxious influences of transport, by covering them with any antiseptic material and the usual bandages. According to the progress of science, the military surgeons in different countries have come, by experience, to the direction, in the modern treatment of wounds, which found in Mr. William Scovell Savory, F. R. S. London, an eloquent representative. After having spoken of the results got in St. Bartholomew's, and in the Kilmarnock Infirmary, which have been published by Dr. McHail, he continued, and recommended that these great principles of rest and cleanliness—the maintenance of what is now called an aseptic state—be enforced, if surgery be sufficiently antiseptic, and not too meddlesome; then, no doubt, there may be much variation in detail and yet withal the best results."

That direction has long been combated by those who only approved the exact application of Lister's treatment of wounds in every peculiarity. A change, however, would come, since we have acknowledged the simple truth that *life is the great antiseptic*, and that we do not treat the wound, but its secretions; in consequence, our endeavor has been to preserve it, to restore healthy function, to control by rest, position, and pressure, nervous, vascular and muscular action, so as to minimize the material for and the causes of discharges. We limit the secretions to a minimum, and once formed, we make them harmless under a permanent dressing, under a so-called "Dauer Verbard," dirty in the ordinary acceptation of the term, but surgically clean because it is aseptic.

We have seen that surgery in time of peace, has come on an equal footing—in its endeavors at simplification—with surgery in time of war, as soon as the conviction gained ground, that the irrigation by antiseptic solutions had to be rejected, as bad in general and worse in antiseptic surgery, and that the whole principles of wound treatment was to be summed up in the one word—REST. By cleanliness and repose we can also use the powerfully antiseptic aid of the blood clot. The wounds not stimulated, or less stimulated by antiseptic solutions, did not secrete, or secreted only very little. The drainage, with its dangers, could be avoided. On the contrary, the secretions of wounds reduced to a minimum, could be easily absorbed by a permanent dressing holding an antiseptic solution and drying out in it, and in other words, becoming harmless. To preserve us in the end from deception, a barrier must be placed between the wound and the dressing, which does not, however, prevent the flowing away of the secretions. That new *guard* was got in the iodoform gauze, which, combined with another antiseptic material, corrosive sublimate, makes the formed secretions harmless. Iodoform works here as a powerful reserve of antiseptic material, or, in other words, like an antiseptic *filter*. Finally, the two materials are to complete each other.

*Dry and absorbent dressings* are so intimately associated with *infrequency and compression* as factors in wound treatment, that we may be compelled again to travel over ground already trodden. In general terms we agree with the late Sampson Gamgee, of Birmingham, that repair and consolidation, decay and liquefaction of animal struc-

tures proceed together, and that healing is rapid, in direct ratio to dryness and compactness of tissue; in reverse ratio to effusion and laxity. The inference that surgical dressings are perfect in proportion as they contain less water and are more active in carrying off discharges, finds abundant support in practice. The question must at least be answered: In which way shall the antiseptic material be transported, or how shall the antiseptic bandages be divided among the combatants? The answer to this question is immediately followed by a second: which person shall apply these bandages? The answer cannot be doubted. It is not of much importance with which kind of material the wound is bandaged, in comparison with the way in which that material is applied. The giving of antiseptic material to the soldiers in war cannot be recommended, for several reasons. Neither the wounded nor the comrades in the ranks nor the bearers of the bearer companies, will usually be able to apply that bandage. The men of said companies are also turning off from their chief business and ordinary task, to transport the wounded quickly and carefully to the dressing station. This is generally admitted, and nevertheless, contrary to it, is proposed, from different sides, to procure to every soldier in the field a first field dressing, to be only used in exceptional cases. In that, we see a concession to the æsthetic and dilettante element in military surgery, with a great expense of money—as an inevitable consequence—that amuses those who pay for it. Therefore, it is proposed to limit the distribution of the first field dressing to the non-commissioned officers, and in view of great movements of troops in time of war. During siege arrangements, and generally in battles, in which the troops take a more fixed position, the distribution of a first field dressing can be safely omitted. It would be desirable in every case to distribute the antiseptics among the combatants only in time of war, and more especially before battle. In that way the introduction of a first field dressing is a reserve of antiseptic material, on which cannot be reckoned; in other words, *a moral support*. If we bear in mind what the great authorities in surgery and military surgery have said, we come, with the Director General of the British Army Medical Department, to the conclusion, *that the less done for the wounded soldier until he falls into the hands of the surgeon, the better it would practically be for him;* and that, when he has once fallen into the hands of the surgeon, the means should be at hand to dress the wounds, that the man may be sent safely to the rear, without touching him again until he is in a comfortable hospital.

What is wanted is a good staff of military surgeons, well equipped, with carriage provided for their materials. If we could succeed in having the appliances on the field, we should not fail to find a sufficient number of surgeons to give a good account of the wounded in future.

# ÜBER DEN GEGENWÄRTIGEN STANDPUNKT BETREFFS ANTISEPSIS UND DIE BESTE ART DER APPLIKATION IM KRIEGE.

## ON THE PRESENT STANDPOINT OF ANTISEPSIS AND THE BEST MODE OF THE APPLICATION IN WAR.

## SUR LA PRESENTE SITUATION DE L'ANTISEPSIE ET LE MEILLEUR MODE D'APPLICATION DANS LA GUERRE.

VON DR. NEUDÖRFER,

Wien.

MEINE HERREN! — Sie haben in der vorhergehenden Sitzung der III. Sektion durch Ihre belehrende und sachliche Discussion über den Einfluss, den die modernen Waffen, die correctere Organisation der ersten Hilfe, die Präcision der Indikationen der im Felde unerlässlichen Operationen auf die *Conservative Chirurgie* üben, viel Licht verbreitet, der erhaltenden Chirurgie Vorschub und der Humanität grossen Nutzen geleistet. Heute wird es Ihre Aufgabe sein, darzuthun, welchen Einfluss die Antisepsis auf die conservative Chirurgie zu üben vermag und in welcher Art die Antisepsis im Kriege ausgeführt werden kann und soll.

Es wird sich empfehlen, damit zu beginnen, wie sich die Frage der Antisepsis entwickelt hat und was wir gegenwärtig unter diesem Worte verstehen. Ohne mich in weitläufige und ermüdende historische Erörterungen einzulassen, will ich anführen, dass die Sepsis der Wunden schon den ältesten Chirurgen bekannt gewesen ist. In früheren Zeiten hat man die Eiterung zur Heilung einer Wunde für unerlässlich gehalten. Man hat in dem Eiter das Bildungsmaterial gesehen, das aus dem Granulations- und Narbengewebe gebildet wird, und hat diesen Eiter *Pus bonum et laudabile* genannt, im Gegensatze zu dem dünnflüssigen, übelriechenden Eiter, der mit Zerfall des Gewebes, mit allgemeiner Krankheit, mit metastatischen Ablagerungen und nicht selten mit lethalem Ausgange verbunden war. Eine Heilung *per primam intentionem* war nur bei Hautwunden bekannt; für Höhlenwunden wurde eine Heilung ohne Eiterung für unmöglich gehalten.

Die schlechte Beschaffenheit des Eiters hat man zwar auch früher gewissen Ursachen und Einflüssen, die ausserhalb der Wunde gelegen sind, zugeschrieben, hauptsächlich aber hat man die Ursache des schlechten Eiters in der Constitution, in dem Gesundheits- und Ernährungszustand des Verwundeten gesucht. Die äusseren, die Wunde benachtheiligenden Einflüsse wurden in der Verdorbenheit der äusseren Luft, in der ungesunden Lage des Spitals und, speciell bei Schusswunden, in der giftigen, das Wundsekret zersetzenden Eigenschaft der Projektile gesucht. Dieser Anschauung entsprechend, haben die älteren Chirurgen eine Reihe von Wundwässern angegeben, mit denen die Wunden gewaschen werden sollen, um eine Zersetzung der Sekrete und des Eiters zu verhüten. Andere Chirurgen haben zur Erreichung dieses Zweckes die Wunden, und ganz besonders die Amputationswunden, mit siedendem Oele, mit ätzenden, Entzündung erregenden Salben behandelt. Zerfallende Wunden wurden mit verschärfenden Pasten bedeckt und selbst mit dem Glüheisen ausgebrannt. Gegen Ende des vorigen Jahrhunderts hat man als Ursache der Eiterzersetzung, der Sepsis, die Retention des Eiters und anderer Sekrete erkannt. Man hat sich vorgestellt, durch Schwellung der Gewebe in der Wunde in Folge der Entzündung sollen die Wundöffnungen verengt und selbst ganz verschlossen werden; Blut, Blutserum und Eiter werden daher in der Wunde zurückgehalten, zersetzen sich daselbst und infiziren den Körper. Zur Verhütung der Sekret-Retention hat man die Regel aufgestellt: Die Oeffnungen einer jeden Schusswunde, auch bei Schädelverletzungen, ohne Rücksicht

auf die Entstehungsursache, müssen eingeschnitten, erweitert und entspannt werden. Man nannte dieses Verfahren das *Debridement* der Wunden.

Mehr Gewicht als auf die von aussen stammenden Ursachen hat man den von der Constitution, den Gesundheits- und Ernährungs-Verhältnissen des Verwundeten stammenden Ursachen auf die Zersetzung der Sekrete und des Eiters beigelegt. Man hat daher den Verwundeten mit Aderlässen und mit lokalen Blutentziehungen, sowie mit Entziehung der Nahrung behandelt und auf diese Weise geglaubt, die zur Wundheilung nöthige Entzündung nicht übermässig gross werden zu lassen.

Man sieht aus dem Gesagten, dass das Bestreben, die Zersetzung der Sekrete (die Sepsis in der Wunde) zu verhüten, schon alten Datums ist. Man hat jedoch allmälig angefangen, die alten Arquebusaden, die reizenden Salben, das siedende Oel, die entspannenden Einschnitte, die allgemeinen und lokalen Blutentziehungen und die anderen prophylaktischen Mittel als entbehrlich und zum Theil als schädlich zu beseitigen. Man hat angefangen, den Verwundeten zu nähren, die Wunde ganz in Ruhe, sich selbst zu überlassen, und sich damit begnügt, dieselbe durch einen einfachen Wunddeckverband gegen äussere Schädlichkeiten zu schützen. Vinzenz von Kern in Wien hat schon 1825 gelehrt, die Wunden offen zu behandeln. Bartscher Burow (der Aeltere) und Vezin haben in den 50er Jahren die offene Wundbehandlung zur allgemeinen Methode der Wundbehandlung erhoben. Billroth, Nussbaum und besonders Krönlein blieben lange Zeit hindurch warme Anwälte der offenen Wundbehandlung.

Neben der offenen Wundbehandlung waren die verschiedensten Behandlungsmethoden in Anwendung, die sich nach den verschiedenen chirurgischen Schulen verschieden gestaltet haben. Eine allgemein angenommene Methode der Wundbehandlung gab es nicht. Selbst in einem und demselben Lande, in derselben Fakultät, in demselben Spitale haben die einzelnen Chirurgen ihre eigene Methode gehabt. Am meisten verbreitet war die Behandlung mit lauen und warmen Wasser-Fomenten, mit Essigsaurer Tonerde, mit Kampfer-Spiritus, Kampfer-Wein-Fomenten, mit Aufgüssen aromatischer Kräuter, der Chamomilla und mit warmen Cataplasmen. In den Jahren 1849–1859 hat die Eisbehandlung auf die Empfehlung von Strohmayer und Esmarch einen grossen Aufschwung genommen. Man hat sich vorgestellt, dass die Kälte jede Zersetzung zu verhüten vermag, hat daher die Wunde von dem Momente ihrer Entstehung bis zur vollständigen Vernarbung continuirlich mit Eis behandelt. Nur mit Rücksicht auf die schmerzstillende Wirkung des Eises vermochte diese nicht zu rechtfertigende Methode der Wundbehandlung sich durch relativ längere Zeit auf der Oberfläche zu erhalten.

Ein wahrhafter Fortschritt in der Wundbehandlung ist *Chassaignac* zu danken. Dieser Chirurg hat, um eine Resorption von zersetztem Sekret von Seite der Wunde zu verhüten, vorgeschlagen, die Operationen, anstatt mit dem Messer, mit dem Ecraseur auszuführen. Dadurch sollen die Wundwände verdichtet und zur Resorption überhaupt ungeeignet, die Operation ohne Blutung und Gefahr einer Nachblutung ausgeführt werden. Sein Hauptverdienst aber besteht in der Einführung der Drainage in die Methode der Wundbehandlung, um Eiter und andere Sekrete aus der Wunde abzuleiten. Chassaignac's Drainage ist eine eminent antiseptische Maassregel, die auch noch heute ihren vollen Werth hat.

Im Jahre 1859 haben Demeau und Corne * den Coaltar, ein Gemisch von frischgebranntem Gyps mit 3 bis 5 Procent Steinkohlentheer (*Goudron d'huille*), zur Wundbehandlung empfohlen, um die Zersetzung der Sekrete in der Wunde hintanzuhalten. Ich selbst habe zu dem gleichen Zwecke das von Reichenbach entdeckte Kreosot angewendet und empfohlen, und Jules Lemaire hat die damals neu entdeckte Karbol-

* Compt. rend. 18ten Juli 1859.

säure zur Wundbehandlung und zur Verhütung einer Sekret-Zersetzung warm empfohlen. Wenn auch alle diese Vorschläge nicht durchgedrungen sind, das Coaltar, das Saponin, das Kreosot und die Karbolsäure sich nicht als allgemein angenommene zersetzungswidrige Mittel in der Wundbehandlung erheben konnten, so haben doch die günstigen Heilresultate, die mit diesen Agentien erzielt worden sind, viel dazu beigetragen, die Bahn zu ebenen, die Gemüther vorzubereiten und die antiseptische Aera einzuleiten.

Der eigentliche Begründer dieser Aera ist Pasteur. Pasteur hat nachgewiesen, dass die verschiedenen Arten von Fäulniss und Gährung nur durch Mikroorganismen bedingt sind. Die Bakterien stammen nach Pasteur aus der Luft; wenn es gelingt, den Mikroben den Zutritt zu einer zersetzungsfähigen Substanz zu verwehren, so bleibt auch die Fäulniss und die Gährung in derselben aus. Pasteur hat auch in der Karbolsäure ein verlässliches bakterocidisches Mittel erkannt. Josef Lister, der die Arbeiten Pasteur's für englische medicinische Zeitschriften exzerpirt und referirt hat, hat den Versuch gemacht, die Lehren Pasteur's auf die Chirurgie zu übertragen. Lister hat damit angefangen, die einfachen mit den complicirten Frakturen zu vergleichen. Er leitete die Gefährlichkeit der Letzteren von den aus der Luft in die Wunden gefallenen Bakterien ab. Die Bakterien sollen sich in der Wunde rasch vermehren und dadurch die accidentellen Wundkrankheiten und selbst den Tod des Verwundeten herbeiführen. Im Jahre 1867 hat er die ersten schüchternen Versuche gemacht, die Bakterien in der Wunde durch die Anwendung der Karbolsäure zu tödten. Bald jedoch hat er die Methode der Tödtung der Bakterien in der Wunde durch die concentrirte Karbolsäure aufgegeben und ist zu der Methode übergegangen, den Bakterien den Zutritt zu der Wunde zu wehren. Der Karbolnebel oder Spray sollte die Mikroben in der Luft, während einer Operation oder während des Verbandwechsels tödten. Für die Wunde selbst hatte er einen bis in die kleinsten Details genau vorgeschriebenen Wundverband angegeben, den er fortwährend zu vervollkommnen gesucht hat, den allgemein bekannten, complicirten Lister-Verband, von dem behauptet wurde, er sei so schwer zu erlernen und zu beherrschen, weshalb die Forderung gestellt wurde, wer den Verband Lister's ausführen wolle, dürfe von den Vorschriften Lister's nicht um eine Haaresbreite abweichen. Lister hatte den glücklichen Gedanken, seine Methode der Wundbehandlung eine *antiseptische* zu nennen; und dieser treffende Name hat sehr viel dazu beigetragen, seiner Methode den Erfolg zu sichern. Lister's Verband hat sich in kurzer Zeit die ausschliessliche Herrschaft auf dem ganzen Erdball zu erringen und dieselbe durch mehrere Jahre zu erhalten gewusst. Jeder Versuch, den Formalismus des Lister-Verbandes als entbehrlich zu bezeichnen, wurde als Blasphemie bezeichnet, ein jeder beim Wundverbande nicht streng nach Lister vorgehende Chirurg wurde von den Anhängern Lister's in den Bann gelegt. Nur durch den Terrorismus von Lister's Anhängern (Lister selbst, das muss man zu seinem Lobe sagen, war viel duldsamer gegen die Gegner seiner Methode) konnte der Listerismus die Autokratie in der Chirurgie fast ein Decennium hindurch behaupten. Irrthümer und extreme Anschauungen vermögen jedoch nicht, sich auf die Dauer zu behaupten, früher oder später bricht sich die Wahrheit doch die Bahn; so war es auch mit dem Lister-Verbande. Es ist Wahrheit, dass mit der Methode Lister's günstigere Heilresultate erzielt worden sind; es ist ferner wahr, dass mit dem Streben, die Bakterien von der Wunde fern zu halten, auch der Staub, die unreinen Hände, die verunreinigten Instrumente, infizirte Schwämme und infizirte Verbandmaterialien von der Wunde fern gehalten werden, und in der Abhaltung dieser Schädlichkeiten von der Wunde ist die Hauptursache des Erfolges Lister's zu suchen. Man versuchte, den Spray vom Lister-Verbande wegzulassen, dann hat man *Silk protection* beseitigt, dann die Manipulation der *Antiseptic gauze* und mit dem *Makintosh* abgeändert und die Resultate blieben, wie das nicht anders sein konnte, die gleich günstigen wie bei den streng nach Lister

behandelten Fällen. Später suchte man die Karbolsäure durch die Salicylsäure, durch Thymol und durch andere antiseptische Medikamente zu ersetzen, und so hatte man allmälig den orthodoxen Lister-Verband bis zur Unkenntlichkeit umgewandelt, ohne die günstigen Heilresultate zu beeinträchtigen.

Ich für meine Person war von allem Anfange an ein Gegner des complicirten Lister-Verbandes und habe gezeigt, dass mit Hilfe skrupulöser Reinlichkeit man mit jedem Wundverbande gleich gute Resultate wie mit dem Lister-Verbande erzielen könne. Ich habe gezeigt, wie einfach und wirkungsvoll der Wundverband mit verschiedenen organischen und unorganischen pulverförmigen Substanzen, Streupulvern, die das Blutserum, den Eiter und andere Wundsekrete aufsaugen, sich ausführen lasse; doch ist es mir nicht gelungen, den Glauben an die Nothwendigkeit des Formalismus des Lister-Verbandes zu erschüttern. Erst als Mosetig-Moorhof das Iodoform als trockenes Streupulver auf die Wunde zum Wundverbande empfohlen hat, und als von mehreren Seiten Berichte über die günstigen Heilresultate mit dem pulverförmigen Iodoform-Verband einliefen, da wendeten sich die Chirurgen dem Iodoform-Wundverbande zu. Erst mit dem Iodoform wurde die chirurgische Welt von dem Banne des Lister-Verbandes befreit. Das Iodoform hat noch schneller als der Lister-Verband seinen Siegeslauf über die ganze Erde vollendet und es hatte den Anschein, als sollte der Iodoform-Verband der einzige stets herrschende Wundverband bleiben. Doch bald sollte auch das Iodoform die Wandelbarkeit der Gunst und der Herrschaft erfahren. Bald kamen Berichte über Iodoform-Intoxikationen, die beim Iodoform-Verbande in Form von Neurosen und Psychosen aufgetreten sind, und die in einzelnen Fällen zum Tode geführt haben; dazu kam noch, dass der üble penetrante Geruch des Iodoforms, der auf keine Art ganz zu beseitigen ist, von einzelnen Personen absolut nicht vertragen werden kann. Deshalb hat man angefangen, das Iodoform zu verlassen und sich nach anderen Pulvern umzusehen. Kocher hat hierzu das salpetersaure Wismuthoxid, Andere das Naphtalin vorgeschlagen, ohne dass diese Vorschläge besonderen Anklang bei den Fachgenossen gefunden hätten. v. Bergmann, damals in Würzburg, hat die trockenen pulverförmigen Verbände verlassen und ist zum feuchten Wundverbande zurückgekehrt. Er wählte den Sublimat als Antisepticum. Nachdem Koch den Sublimat als das wirksamste Antisepticum und Bactericidium erprobt hat, haben sich die Chirurgen diesem Mittel zugewendet. Der Sublimat hat in diesem Augenblick eben so viel Anhänger als alle andern antiseptischen Mittel, die Karbolsäure, die Salicylsäure, das Iodoform u. s. w., zusammen genommen. Die Suche nach neuen antiseptischen Mitteln hat aber nicht aufgehört; man fand bald das Resorcin, das Aseptol, das Salol und andere. Wir leiden jetzt an einem *Embarras de richesse* an baktericiden Substanzen.

Gerade so, wie mit den Antisepticis geht es uns mit den Wundverband-Materialien, da haben wir die Charpie-Baumwolle, das Oakum, die Jute, den Lint, die Gaze oder Mull, die entfettete Baumwolle, die Holzwolle, den Torf, das Moos Sphagnum, das Sägemehl etc., etc. Wenn Sie jetzt die verschiedenen chirurgischen Kliniken in Abtheilungen durchwandern, so finden Sie, dass jeder Chirurg sein besonderes Antisepticum, sein besonderes Wundverbandmaterial und seine eigene antiseptische Methode hat. Es gibt keinen einheitlichen Wundverband mehr. Nachdem aber die einzelnen Chirurgen mit ihren verschiedenen Methoden gleich gute Resultate aufzuweisen haben, so ist gegen die grosse Verschiedenheit der antiseptischen Mittel und der Wundverband-Materialien nichts einzuwenden. Anders verhält sich die Sache im Kriege; da ist eine einheitliche Methode und ein einheitliches Verbandmaterial unerlässlich, weil die Antiseptica und Verbandstoffe mitgeführt werden müssen, es aber unmöglich ist, alle die verschiedenen Verbandstoffe und antiseptischen Medikamente in hinreichender Menge mitzuführen. Ehe ich Ihnen die Wahl der in's Feld mitzuführenden Antiseptica und Verbandmaterialien zur Entscheidung unterbreite, will ich den gegenwärtigen Standpunkt der Antisepsis in wenigen Sätzen skizziren.

Wir halten weder die Entzündung noch die Eiterung zur Heilung einer Wunde nöthig; wir nehmen an, dass sowohl oberflächliche Haut-, als auch tiefe Höhlenwunden ohne Entzündung (ohne Reaktion) und ohne Eiterung, afebril durch eine Art *prima intentio* heilen können, dass diese Art der Heilung ohne Reaktion und Eiterung den normalen reparativen Vorgang darstellt, wenn keine Störung desselben vorhanden ist. Die Entzündung, die Eiterung und das Fieber sind die Folgen von Schädlichkeiten, die auf die Wunde eingewirkt haben. Diese Schädlichkeiten sind Mikroben, die in die Wunde gelangt sind und dort Eiterung hervorgerufen haben. Hüter war der Erste, der die Ansicht als seine Ueberzeugung ausgesprochen hat, dass ohne *Monaden* keine Eiterung vorhanden ist.

Die Frage, ob in gutem Eiter stets Mikroben zu finden sind, ist noch nicht mit Sicherheit beantwortet, dagegen lassen sich in dem Sekrete einer septischen Wunde stets Mikroben nachweisen, die man in eine causale Verbindung mit der Sepsis bringt; diese Mikroben haben pathogene Eigenschaften und rufen, auf eine reine Wunde übertragen, Sepsis in derselben hervor. Es ist möglich, dass pathogene Mikroben aus der Luft in die Wunde fallen und daselbst Sepsis hervorrufen; doch wird eine solche Infektion nur selten stattfinden. In der Regel kommt die Infektion durch direkte Uebertragung bei Berührung der Wunde mit unreinen Händen, mit unreinen Instrumenten und Schwämmen, mit septische Keime enthaltendem Wasser, durch Verbandstoffe, die direkt verunreinigt worden, oder die lange dem Staube ausgesetzt gewesen und nicht desinfizirt oder sterilisirt worden sind. Man nimmt ferner an, dass eine Wunde, die nur mit reinen Händen, mit reinen Instrumenten, mit sterilisirten Tupfern und Verbandstücken in Berührung kommt, rein bleibt, wenn dieselbe auch mit desinfizirenden Mitteln behandelt wird. Eine septisch infizirte Wunde kann durch die Anwendung antiseptischer Heilmittel rein-, d. h. der Fortschritt der Sepsis kann aufgehalten werden, doch ist dieses nicht mit Bestimmtheit zu erwarten ; oft genug bleiben die Antiseptica bei vorhandener Sepsis ganz wirkungslos. Aseptisches Blut, aseptisches Blutserum und aseptisches Wundsekret brauchen nicht aus einer Wunde abgeleitet zu werden ; diese Flüssigkeiten können mit Beruhigung in der Wunde gelassen, daselbst resorbirt oder organisirt werden ; dagegen müssen Blut- und Wundsekrete, die septisch sind, oder deren Asepsis nicht mit Sicherheit anzunehmen ist, nach aussen geleitet, drainirt werden. Ob aseptische Flüssigkeiten, lebendes Blut, Eiter, durch die Anwendung antiseptischer Mittel getödtet werden und drainirt werden müssen, oder ob dieselben ohne Schaden in der Wunde verbleiben dürfen, ist zur Stunde noch eine offene Frage. Einige Chirurgen glauben die Drainage in diesen Fällen entbehren zu können, während andere Chirurgen dieselbe auch in solchen Fällen nicht missen wollen. Die Chirurgen halten die Karbolsäure, die Salicylsäure, das Iodoform, den Sublimat in ihrer Wirksamkeit, die Sepsis zu verhüten, gleichwerthig, die Bakteriologen, welche die Wirksamkeit der Antiseptica aus ihren bactericiden Eigenschaften beurtheilen, sind anderer Ansicht. Ich werde auf dieselbe später zurückkommen.

Auch die grosse Zahl von Verbandstoffen wird zwar von den Chirurgen als gleich brauchbar zum Wundverband betrachtet, dennoch haben sich nicht alle diese Materialien der gleichen Gunst der Chirurgen zu erfreuen, die Mehrzahl derselben wendet den weitmaschigen Mull oder Gaze, mitunter auch entfettete Wolle an, dagegen wird die Jute, der Lint, die Holzwolle, und die aufsaugenden Pulver gar nicht, der Torf, das Sphagnum, das Sägemehl u. s. w. nur in Form von Verbandkissen angewendet.

Sehr getrennt sind die Ansichten darüber, ob zum antiseptischen Verband auch eine impermeable Decke gehört, sowie über die Dauer von einem Verbandwechsel zum andern. Diejenigen, die der Ansicht Lister's über die Provenienz der Mikroben aus der Luft anhängen, fürchten bei einem Wundverbande, bei dem das Wundsekret durchschlägt, dass die aus der Luft fallenden Bakterien in dem durchfeuchteten Wundverbande sich vermehren und auf demselben Wege, den das Wundsekret nach

aussen genommen hat, zur Wunde gelangen und daselbst Unheil anrichten können. Diese Chirurgen wollen daher den Wundverband durch einen impermeablen Stoff, Makintosh, Guttapercha, Billroth-Papier, Battist, schützen, und wollen überdies, um ganz sicher zu gehen, den Verband erneuern, sobald das Sekret an den oberflächlichen Verbandschichten kenntlich wird. Andere Chirurgen, die weniger von der Furcht vor den aus der Luft stammenden Bakterien beherrscht sind, perhorresziren den impermeablen Stoff als Theil des Wundverbandes, lassen das durchschlagende Sekret im Verbande an der Luft eintrocknen und den Wundverband möglichst lange liegen (Dauerverband). Nur in jenen Fällen, wo es sich darum handelt, das Bett, die Kleider gegen das Sekret zu schützen, wenden sie den impermeablen Stoff an, der aber dann kein Bestandtheil des antiseptischen Wundverbandes bildet. Mit dem Vorhergehenden habe ich den gegenwärtigen Standpunkt der Antisepsis skizzirt. Ehe ich nun zur Anwendung der Antisepsis im Kriege übergehe, möchte ich zuerst feststellen, ob Schusswunden als solche aseptische oder infizirte Wunden sind, weil die Entscheidung dieser Frage die Wahl des Antisepticums beeinflusst. — Die Bakteriologen lehren, dass die Oberflächen aller Körper ohne Ausnahme, sobald dieselben nicht desinfizirt oder sterilisirt worden, gleichviel ob dieselben mit Staub bedeckt oder staubfrei sind, Mikroben der verschiedensten Art, darunter auch solche von pathogenem Charakter, enthalten. Da nun das abgeschossene Projektil, jene Stelle der Kleidung und der Haut, die es beim Eindringen in den menschlichen Körper passirt, nicht früher desinfizirt oder sterilisirt worden sind, so werden die auf dem Projektile, in der Kleidung und der Haut befindlichen Mikroben in die Wunde getragen; eine jede Schusswunde sei daher *ipso facto* eine im bakteriologischen Sinne infizirte und keine reine oder aseptische Wunde.

Es scheint jedoch, dass diese Anschauung nicht ganz berechtigt ist. Bei aller Anerkennung des bakteriologischen Standpunktes *glaube ich doch eine Schusswunde im Allgemeinen als eine reine oder aseptische Wunde bezeichnen zu sollen.* Meiner Ansicht nach ist ein Projektil, das vor dem Abfeuern mit Bakterien dicht bedeckt war, doch nicht im Stande, die Wunde, die es schlägt, zu infiziren, weil das Projektil, bevor es den Gewehrlauf verlässt, bei der Entzündung des Pulvers in der Pulverkammer, wenn auch nur für sehr kurze Zeit, einer Temperatur von mehreren Tausend Graden ausgesetzt bleibt, welche die Mikroben zu tödten und unschädlich zu machen vermögen. Dazu kommt noch, dass das Projektil im Gewehrlaufe einem Drucke von mindestens 8–10 Atmosphären ausgesetzt ist, ein Druck, von welchem Mikroben getödtet werden (Paul Bert). Endlich wird das Projektil im Laufe fest an die Wand gepresst. Die Mikroben an dem Projektil würden daher, wenn sie noch lebten, von der Oberfläche desselben abgestreift oder zerrieben werden. Das Projektil ist daher einem sterilisirten, verwundenden Instrumente gleich zu halten. Beim Durchdringen des Projektils durch die Kleider und durch die Haut können zwar einzelne in diesen Geweben befindliche Mikroben mitgerissen und in die Wunde getragen werden; doch dürften dieselben kaum die Wunde infiziren, weil die Mikroben in der Regel durch Druck getödtet sein und nicht selten mit dem Projektil die Wunde verlassen haben werden. Ein etwa in der Wunde liegen gebliebener Mikrobe wird durch das ausfliessende Wundsekret nach aussen befördert und würde, selbst wenn er liegen bliebe, falls es sich nicht um einen stark infizirenden Mikroben, etwa um ein *Bakter. anthracis* handelte, kaum einen Schaden in der Wunde anrichten. Nur wenn mit dem Projektil ein mit Bakterien bedeckter Tuch-, Leinen- oder Hautlappen in die Wunde getragen wird und daselbst liegen bleibt, können und werden die Spaltpilze sich vermehren und die Wunde infiziren. Dasselbe Verhältniss wird obwalten, wenn das Projektil irgend wo anschlägt, ricochetirt und fremde Körper, Erde, Sand, Baumrinde etc. mitreisst und in der Wunde liegen lässt. Wir können daher behaupten: Einfache Schusswunden sind reine, nicht infizirte, aseptische Wunden, dagegen sind solche Schuss-

wunden, in denen mitgerissene fremde Körper, Erde, Tuch, Haut etc. liegen geblieben, verunreinigte, infizirte Wunden. Wir können hinzufügen, dass die mit den modernen Waffen (mit kleinem Kaliber, grosser Geschwindigkeit, grosser Tragweite, unveränderlichem Projektil) gesetzten Schussverletzungen reine, nicht infizirte Schusswunden erzeugen werden. Nachdem aber auch reine, sterilisirte Wunden durch die Berührung mit einer unreinen Hand, mit nicht gereinigten Verbandstücken sicher infizirt würden; nachdem ferner die Hand des Sanitätsmannes und des ersten Helfers nicht desinfizirt ist und nicht desinfizirt sein kann, so ist es klar, dass der durch den Helfer der Wunde zugefügte Schaden grösser sein wird, als jener ist, der durch die aus der Luft auf die Wunde fallende Mikrobe angerichtet werden kann. Deshalb wurde die Forderung gestellt, die Wunde bei der ersten Hilfe von der Hand des Helfers unberührt zu lassen und seine Thätigkeit auf die provisorische Immobilisirung der Fragmente und auf das Wegtragen des Verwundeten aus der Feuerlinie einzuschränken. Die Verwundeten sind direkt auf den Verbandplatz zu bringen, wo Aerzte, sterilisirte Hände und sterilisirtes Verbandmaterial vorhanden sind.

Nachdem nun die Mehrzahl der auf den Verbandplatz gelangenden Schusswunden, wenn dieselben nicht durch die Hand des Helfers infizirt worden sind, reine, nicht infizirte, aseptische Wunden sein werden, so brauchte man, strenge genommen, zum Wundverbande gar kein Antisepticum, weil reine Wunden auch ohne die Anwendung eines Antisepticums rein bleiben; dennoch empfiehlt es sich auch bei einfachen, also reinen Schusswunden, ein Antisepticum zum Wundverbande zu verwenden, weil ja möglicherweise doch ein Mikrobe in die Wunde gelangt sein könnte.

Welches Antisepticum anzuwenden ist, wäre von sekundärer Bedeutung, weil in der Hand eines denkenden Chirurgen jedes der vielen antiseptischen Mittel zum erwünschten Ziele führt. Nachdem aber die Antiseptica mitgeführt werden müssen, nachdem man nicht die vielen verschiedenen Antiseptica mitführen kann, so muss man sich für die Wahl eines Antisepticum entscheiden. Zu diesem Zwecke will ich die Vor- und Nachtheile der gebräuchlichen Mittel hier kurz anführen.

Das wirksamste, compendiöseste und am leichtesten zu handhabende Antisepticum ist ohne Zweifel der Sublimat, weshalb der Sublimat in erster Linie als Feld-Antisepticum ins Auge zu fassen ist. Der Nachtheil, der diesem Mittel anklebt, ist seine Gefährlichkeit. Bei allen im Felde anzuwendenden Kautelen werden schwere Intoxikationen doch nicht ausbleiben, und wenn man über weniger gefährliche Mittel verfügt, die für den angestrebten Zweck dasselbe wie das gefährliche Mittel zu leisten vermögen, dann ist es fraglich, ob man sich nicht für das Feld für das minder gefährliche Antisepticum entscheiden soll. Nach dem Sublimat hat wohl das Iodoform die nächste Anwartschaft, als allgemeines Antisepticum für den Feldgebrauch gewählt zu werden, weil seine Applikation als trockener Pulververband sehr einfach, das Mittel compendiös ist und sich bei Schusswunden bereits erprobt hat.

Gegen die allgemeine Einführung des Iodoforms als Feld-Antisepticum sprechen seine geringen antiseptischen und baktericiden Qualitäten, die von R. Koch, von Heyn und Roosing nachgewiesen worden sind, ferner, dass das Iodoform vor seiner Anwendung erst sterilisirt werden muss, weil man sonst mit dem Iodoform, in welchem die verschiedenen Mikroben lebensfähig bleiben, die Wunde infiziren kann. Es sind ja Beispiele bekannt, dass mit dem Iodoform Syphilis, vielleicht auch das Erysipel (Schede) auf die Wunde übertragen worden sind, ferner die Gefahr der Iodoform-Intoxikation und der üble penetrante, nicht zu beseitigende Geruch desselben. Die günstigen Heilresultate des Iodoforms bei Schusswunden fallen nicht sehr ins Gewicht, weil, wie gezeigt worden ist, Schusswunden im Allgemeinen reine aseptische Wunden sind, die auch ohne jedes Antisepticum gute Heilresultate ergeben. Bei durch fremde Körper (Erde, Tuch, Leinen, Haut etc.) verunreinigten und septisch gemachten Wunden aber hat das Iodoform erst seine Wirksamkeit zu erweisen. Bedenkt man

endlich, dass man unter allen Umständen zum Reinigen der Hände, der Instrumente etc. neben dem Iodoform noch ein anderes Antisepticum braucht, so sieht man, das die Frage, ob das Iodoform sich zum allgemein anzunehmenden Antisepticum für das Feld eignet, nicht unbedingt bejaht werden kann, wie dies seine Lobredner thun.

Von den vielen pulverförmigen Substanzen, das salpetersaure Wismuth, das Naphthalin, das Borsäure- und Salicylpulver, das Salol, die vielen versuchten organischen und anorganischen Pulver, sind im Felde noch nicht genug erprobt, sind auch nicht von allen Chirurgen anerkannt; das Resorcin, das Thymol, Aseptol sind nicht genug studirt. Es blieben also noch unsere ältesten und bekanntesten antiseptischen Mittel, die Karbolsäure und die Salicylsäure, über deren Vorzüge und Nachtheile ich nichts anzuführen brauche, weil dieselben ohnehin allgemein bekannt sind. Ich will der Discussion die Entscheidung überlassen, welches Antisepticum unter den bisher bekannten Mitteln für den Feldgebrauch den Vorzug verdient.

Ein sehr wirksames, bei allen Schusswunden ohne Ausnahme anzuwendendes Antisepticum ist die Drainage der Wunden. Sowohl beim Wechsel- als beim Dauerverbande und ohne Rücksicht auf die angewendete antiseptische Flüssigkeit, ist, besonders bei Höhlenwunden, die Anwendung der Drainage unerlässlich, um die Retention und Zersetzung des Wundsekrets zu verhüten. Es ist zwar möglich, dass die Drainage nicht in allen Schusswunden nöthig ist, weil das Sekret aseptischer Wunden resorbirt oder organisirt werden kann; doch ist nicht viel verloren, wenn auch solche für den Organismus verwendbare Sekrete durch die Drainage nach aussen geleitet werden; dagegen ist es von grösster Wichtigkeit für die Gesundheit und das Leben des Verwundeten, schädliche, d. i. infizirende Sekrete durch die Ableitung mittelst Drainage-Röhren für den Verwundeten unschädlich zu machen. Der Sicherheit wegen sollen daher alle Schusswunden ohne Ausnahme, aseptische und unreine Schusswunden, drainirt werden.

Als Drainröhren empfehlen sich noch heute die alten, von Chassaignac angegebenen, durchbohrten Röhren aus glattem vulkanisirtem, oder aus Naturgummi. Die weichen Kautschukdrains sind den von Hüter angegebenen, biegsamen oder starren Metalldrains, den Glasdrains, den von Lister angewendeten Rosshaar-, Catgutdrains, den von Neuber angegebenen, aus entkalkten Vogelknochen angefertigten Drainröhren und den von Schede und Esmarch empfohlenen Drains aus Glasfäden-Geflechten entschieden vorzuziehen.

Als Wundverband-Material empfiehlt sich ein breitmaschiger Mull oder Gaze (5 Kette, 5 Schuss), welche entfettet, eventuell auch im Naturzustande, mit antiseptischen Flüssigkeiten getränkt oder auch trocken nach einem bestimmten Typus auf die Wunde zu bringen ist, weil die Gaze zu Allem verwendbar ist, zum Deckverbande, zum Ausfüllen der Vertiefungen bei Höhlenwunden, zu Compressen, zu Tupfern und eventuell selbst als Fixirungs-Binden. Doch erheischt die Verwendung der Gaze als Fixirungsbinden ganz besondere Aufmerksamkeit, weil bei deren Verwendung sehr leicht Einschnürungen und ein ungleichmässiger Druck zu Stande kommen; deshalb ist es vorzuziehen, zu Binden den unter dem Namen Cambric bekannten Stoff zu verwenden. Diese Binden sind besser als die früher üblichen gewebten Zwirnbinden, weil die Cambric-Binde weich, elastisch, nachgiebig und doch hinreichend fest ist, ohne einzuschneiden, während die gewebten Zwirnbinden entweder einschnüren oder bald locker werden. Dort, wo mässige Eiterung vorhanden ist, kann die Gaze durch die entfettete Baumwolle ersetzt werden; für stark eiternde Wunden halte ich die entfettete Baumwolle weniger geeignet.

Indessen gibt es Chirurgen, welche die entfettete Baumwolle für alle Wunden, ob sie viel oder wenig eitern, mit Vorliebe anstatt der Gaze als Verbandmaterial anwenden. Da nun die entfettete Baumwolle auch zu Tupfern verwendbar ist, und da dieselbe auch als Filter gegen Mikroorganismen zu benützen ist, so mag die entfettete

Baumwolle immerhin als Concurrent der Gaze zum Feldgebrauche als Wundverbandmaterial gelten gelassen werden. — Die impermeable Einwicklung oder Einhüllung des Wundverbandes ist kein Erforderniss eines antiseptischen Wundverbandes, ist jedoch im Felde zum Schutze der Wäsche, Kleidung und Betten gegen das Wundsekret nicht zu entbehren. Der Billroth-Battist ist das beste impermeable Material für den Feldgebrauch. Bei reinen Schusswunden wird man mit den wenigen genannten Materalien und Antisepticis rasch und sicher zum Ziele kommen ; man wird keine oder eine mässige Eiterung bekommen, einen afebrilen Verlauf, eine verhältnissmässig rasche Vernarbung der Wunde erzielen. Bei durch fremde Körper verunreinigten, septischen Schusswunden wird der Verlauf, welches Antisepticum man auch immer anwenden mag, ein weniger rascher und weniger sicherer sein. Ich will nun den Typus eines im Felde auszuführenden Verbandes anführen : *a*) Der Wundverband bei einfachen Schusswunden. — Der verletzte Körpertheil, i. e. die Wunde und deren Umgebung werden zuerst durch 2–5 pCt. Karbolsäure oder durch 0.6–3.0 pCt. Salicylsäure gewaschen und gründlich desinfizirt. Die ohne langes Suchen entdeckten Fremdkörper werden aus der Wunde extrahirt; selbstverständlich müssen Hände und Instrumente vollständig sterilisirt sein. Eine oder mehrere Gummi-Drainröhren sollen in die Wunde ein- oder durchgeführt werden.

In einzelnen Fällen wird es zu einem günstigen Abfluss des Wundsekrets von Nutzen sein, die nicht verletzte Haut und die Weichtheile an geeigneten Stellen zu durchbohren, zu fenstern und die Enden der Drains und das Wundsekret durch diese Fenster nach aussen zu leiten. Auf die Wunde wird dann eine 2–3 cm. dicke, in der antiseptischen Flüssigkeit getränkte Lage von Gaze oder Mull so gelegt, dass die Wundränder auf jeder Seite von der Gaze um mindestens 5 cm. überragt werden, wobei die Drainröhren durch die Gaze weder geknickt noch gedrückt werden dürfen. Der freie Abfluss des Wundsekrets ist ein souveränes antiseptisches Mittel ; man muss daher die Enden der Drains durch das Wundverbandmaterial hindurchleiten, d. h. für die Drains müssen geeignete Durchlässe durch das Verbandmaterial, wie durch die Haut geschaffen werden. Ueber diese Schichte feuchter Gaze wird eine 2–3 cm. dicke Schichte trockener Gaze, eventuell eine eben so dicke Lage entfetteter Baumwolle, gelegt, welche die erste Gazelage auf jeder Seite um etwa 5 cm. überragt. Dieser Verband wird durch einige Touren einer Cambricbinde fixirt. *b*) Der Wundverband bei Schussfrakturen bleibt derselbe wie bei einfachen Schusswunden, mit dem Unterschiede jedoch, dass neben dem Wunddeckverband noch ein fixirender Verband anzulegen ist. Es gibt keinen einfacheren, leichter anleg- und abnehmbaren, nicht drückenden, jedem Körpertheil sich genau anschmiegenden, fixirenden Verband als den Gypsschienenverband, den ich mit wenigen Worten schildern will : Gestärkter Organtin oder ein anderes Gewebe wird gefaltet und zu Schienen von beliebiger Länge und Breite geformt ; schmale, 2–2.5 cm. breite, aus beliebigem Stoffe geschnittene Streifen von der Länge der Schienen werden in Oel getaucht oder auf beiden Seiten mit Fett bestrichen, in hinreichender Anzahl vorbereitet ; dann wird noch eine Anzahl Streifen aus den in Wasser erweichten Furnirhölzern vorbereitet. Der Verwundete wird jetzt narkotisirt, und in der Narkose werden die Fragmente extendirt und coaptirt. Die Narkose wird zu einer zweckentsprechenden Coaptation ebenso unerlässlich wie zu einem operativen Eingriff sein. Während der Narkose wird man die nöthig werdenden kleinen Operationen, wie das Fenstern der Haut und der Weichtheile für die durchzuleitenden Enden der Drains, das Abtragen von flötenartigen Knochenvorsprüngen, die sich der Reposition und Coaptation der Fragmente entgegenstellen, etc., ausführen. Jetzt wird zuerst der Wunddeckverband angelegt. Die früher zubereiteten Schienen aus gestärktem Organtin werden jetzt durch eine etwa rahmdicke Schichte von Gypsflüssigkeit gezogen, der überflüssige Gypsbrei abgestreift und zuerst an die unverletzten Flächen der Extremität gelegt und daselbst gleichmässig angedrückt.. Zwischen je zwei benachbarten Gyps-

schienen werden die gefetteten oder geölten Streifen gelegt. Die benachbarten Gypsschienen können aneinander stossen oder übereinander greifen; die ganze Extremität wird in einzelne Gypsschienen so gehüllt, dass die Ein- oder Ausschuss-Oeffnung von denselben frei bleibt. Ueber jede Gypsschiene werden zur Versteifung mehrere übereinander gelegte schmale Furnirholzstreifen gelegt und die ganze Extremität sammt den Schienen in coaptirter Lage mit einer Cambricbinde eingehüllt und so lange in Extension und Fixation gehalten bis die Gypsschienen erstarrt sind. Die eingegypste Extremität wird nun in eine Hohlrinne gelegt, die man sich aus einer dreifachen Lage Furnirholz bereitet, und in dieser Hohlrinne abermals mittelst einer Cambricbinde fixirt und dann entsprechend gelagert.

Erwägt man, dass auf dem Verbandplatze neben den typischen Wunddeck- und Wundfraktur-Verbänden nur noch eine kleine Anzahl conservativer, nicht verstümmelnder antiseptischer Operationen auszuführen sein wird, so ist damit die Thätigkeit der Militairärzte auf dem Verbandplatze erschöpft und ihre antiseptische Thätigkeit beendet. Die Verwundeten sind, mit Ausnahme der absolut Intransportabeln, die in den mobilen Hospitälern zurückzulassen sind, sofort für den Transport in die stabilen Heilanstalten mittelst Eisenbahn-Sanitätszüge, Schiffs-Ambulanzen und anderen Krankentransport-Vehikeln weit hinter den Kriegsschauplatz zurückzuführen. Hier endet die Antisepsis im Felde, an ihre Stelle tritt jetzt die Friedens-Antisepsis, die der leitende Chirurg nach eigenem Ermessen, wie in seiner Friedenspraxis, sich wählen kann.

Ich will es nun unternehmen, das Erörterte in Thesen zu formuliren und Ihnen dieselben zur Discussion und Beschlussfassung zu unterbreiten. Diese Thesen lauten:

1. Obwohl es viele Methoden der Antisepsis gibt, die alle zu dem erwünschten Ziele führen, so erheischen es die Kriegsverhältnisse, sich auf eine einzige Methode einzuschränken und für das Feld ein einheitliches antiseptisches Verfahren organisatorisch anzuordnen, weil es weder zweckmässig noch möglich ist, die zu den verschiedenen Schulverbänden nöthigen antiseptischen Mittel und Verbandmaterialien in genügender Menge mitzuführen. Auf dem Verbandplatze kann nur eine einzige Methode der Antisepsis organisationsgemäss gestattet sein; in den hinter dem Kriegsschauplatz gelegenen stabilen Spitälern kann der leitende Chirurg seine Antisepsis nach Belieben, wie in seiner Friedenspraxis, wählen.

2. Auch Höhlenwunden können so wie Hautwunden, ohne Entzündung und ohne Eiterung, durch eine Art *prima intent.* heilen, vorausgesetzt, dass die Wunde nicht septisch verunreinigt ist. Die Entzündung und Eiterung einer Wunde sind nur die Folge von Reizung der Wunde durch Mikroben.

3. In dem Sekrete einer septisch infizirten Wunde sind stets pathogene, übertragbare Mikroben nachzuweisen, welche die Sepsis erzeugt haben. Die Mikroben können zwar aus der Luft stammen, in der Regel stammen dieselben aus einer direkten Uebertragung, durch Berührung der Wunde mit unreinen Händen, Instrumenten, Schwämmen, Wasser und Verbandmaterialien her.

4. Eine reine Wunde, die nicht durch den Chirurgen oder durch den Helfer infizirt worden ist, bleibt rein und aseptisch und heilt, ohne mit antiseptischen Mitteln und Materialien behandelt werden zu müssen.

5. Antiseptische Mittel vermögen den Fortschritt einer bereits vorhandenen Sepsis zu hemmen und die Wunde allmälig aseptisch zu machen; doch kann man auf diese Wirkung nicht mit Sicherheit rechnen. Von allen Wundsekreten ist das Blutserum zum septischen Zerfall am meisten disponirt, während lebendes Blut und Eiter der Sepsis widerstehen.

6. Aseptische Wundsekrete brauchen nicht nach aussen geleitet zu werden, sie können in der Wunde selbst resorbirt oder organisirt werden; septische Sekrete dagegen müssen nach aussen geleitet werden, wenn eine allgemeine septische Infektion verhütet

werden soll. Ob lebende Flüssigkeiten, Blut, Lymphe und Eiter durch Antiseptica getödtet und drainirt werden müssen, oder ob dieselben in der Wunde belassen und ohne Schaden resorbirt werden können, ist noch unentschieden. Beide Ansichten haben zahlreiche Vertreter unter den Chirurgen.

7. Vom bakteriologischen Standpunkte betrachtet, sind alle, auch die einfachen Schusswunden als infizirte Wunden zu betrachten, weil das Projektil die Mikroben der getroffenen Kleider und Haut in die Wunde hineinträgt; vom chirurgischen Standpunkte jedoch sind nur jene Schusswunden als infizirte zu betrachten, in welchen fremde Körper, Erde, Baumrinde, Tuch-, Leinen- oder Hautlappen etc., liegen geblieben sind.

8. Nachdem die Hand des ersten Helfers im Kriege nicht aseptisch ist und es auch nicht sein kann, so ist der Schaden, der durch die Berührung der Wunde mit der unreinen Hand für den Verwundeten erwächst, viel grösser als jener durch einen aus der Luft in die Wunde fallenden Mikroben und als der Nutzen sein kann, den er mit einem zweifelhaften Antisepticum zu bringen vermag.

9. Auch einfache aseptische Schusswunden, die keines antiseptischen Verbandes bedürfen, sind der Sicherheit wegen mit Antisepticis zu behandeln und zu verbinden.

10. In der Hand eines denkenden Chirurgen kann zwar jedes Antisepticum und jede Methode mit Erfolg bei der Wundbehandlung verwendet werden, für den Feldgebrauch jedoch ist es nöthig, in gleichförmiger Weise mit einem Antisepticum, mit demselben Verbandmateriale nach demselben Typus die Wunden zu behandeln.

11. Von den antiseptischen Mitteln ist der Sublimat das wirksamste, aber im Felde mit Gefahren im Gefolge; das Iodoform ist das bequemste Antisepticum, aber nicht genug verlässlich, wirkt auch toxisch, riecht übel und hat noch andere Nachtheile. Die pulverförmigen Mittel und die neuen Antiseptica sind theils noch nicht genug erprobt, theils auch noch nicht allgemein anerkannt. Die Karbolsäure und die Salicylsäure sind Ihnen in ihren Vorzügen und ihren Schattenseiten hinreichend bekannt. Es bleibt Ihnen daher die Wahl und die Entscheidung, welches Antisepticum für den Feldgebrauch zu empfehlen ist.

12. Als Verbandmaterial empfiehlt sich der weitmaschige Mull oder Gaze (5 Schuss, 5 Kette), entfettet oder roh, mit Antisepticis behandelt oder einfach sterilisirt, neben der Gaze zu gleichem Zwecke die entfettete Baumwolle; ferner Cambric-Binden und Billroth-Battist mit der früher gegebenen Motivirung.

13. Ein souveränes für alle Schusswunden gleich wichtiges Antisepticum ist die Drainage der Wunden. Als Drains sind die vulkanisirten Gummiröhren denen aus Metall, aus Glas, aus entkalkten Knochen etc. vorzuziehen.

14. Es ist ein Typus für den Verband einer einfachen Schusswunde und ein solcher für den Verband einer Schussfraktur aufzustellen. Die von mir aufgestellten Typen sollen nur als Paradigma dienen.

15. In die mobilen Hospitäler sind bloss die Intransportabeln aufzunehmen; die übrigen Verwundeten sollen direkt mittels Sanitätszüge, Schiffs-Ambulanzen und anderen Kranken-Transportmitteln in die hinter dem Kriegsschauplatz befindlichen stabilen Hospitäler gebracht werden; dort kann die Antisepsis wie im Friedenshospital geübt werden.

## DEBATE.

In connection with the subject treated in Sir Thomas Longmore's paper, Prof. VON ESMARCH forwarded an abstract of his views, as follows:—

1. Human love commands that every soldier on the field should carry an antiseptic temporary dressing, and for the following reasons:—

2. In war any soldier may be wounded without medical attendance being near, as in outposts, reconnaissances, mounted divisions and great battles.

3. The course of a wound depends, in many cases, entirely on how it is treated directly after the injury. If the wound is immediately examined with unclean fingers or instruments, or, if it remains long in contact with soiled garments, or exposed to the air, the poisoning of the wound by putrefactive irritants is the necessary consequence.

4. Quick covering of the wound with a clean and anti-putrefactive dressing can prevent this danger in many cases.

5. If every soldier carries an antiseptic provisional dressing with him, in some regulated place, then he, or a comrade, can place and fasten it on the wound.

6. Consequently such a dressing must contain—

(*a*) Antiseptic Dressing material sufficient to cover two rifle-ball openings and also a larger wound.

(*b*) An Antiseptic Bandage to fasten the dressing to the wound.

(*c*) A triangular cloth, large enough to support a shattered limb and for adjusting splints or other dressing to the various parts of the body.

7. It is desirable that soldiers be drilled on the application of the dressing, especially in the use of the triangular cloth.

8. The dressing package may be arranged in various ways. The make-up of the accompanying "Packet" seems to me the most practical.

(*a*) Two antiseptic compresses of sublimate salt, mull, 10 ctm. wide, 1 m. long, wrapped in glazed paper.

(*b*) An antiseptic sublimate salt cambric bandage (10 ctm. wide, 2 m. long), with a "safety-pin."

(*c*) A triangular cloth, with safety-pin.

The "Packet" has the following directions for use, printed on it: "In simple shot wounds, one of the compresses, after removing the glazed paper, is placed over each shot opening. In larger wounds the compresses are unfolded and the whole wound surface covered, if possible, with the antiseptic mull. The 'Mull' is fastened to the wound by wrapping it with the bandage."

The triangular cloth serves for further covering to this dressing, for support of the injured limb, or for fixation of provisional splints, as represented in the cloth.

Each "Packet" is 10 ctm. long and broad, 1½ ctm. thick, and weighs exactly 100 gm.

Surgical instrument maker H. Beckman, in Keel, supplies them at 60 pf. (about 15 cents U. S. money). An exhibition of two "Packets" was made to the Section.

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## A SOLDIER'S PACKET FOR PROVISIONAL WOUND DRESSING.

Devised by R. B. Bontecou, M. D., Surg. and Bvt. Col. U. S. V., of Troy, New York.

Since it has been demonstrated by Ryer, Volkmann, Bergmann and other surgeons, that gunshot wounds of the most serious character will heal without suppuration if immediately subjected to antiseptic occlusion, it becomes a necessity to equip the soldier with a dressing for his wound, that he can apply himself, as in battle he is more or less remote from surgical aid.

In view of these facts, provisional dressings have been devised by distinguished surgeons and are now in use in Europe and in this country, notably that of Esmarch, of Germany, and of Longmore, of England.

These dressings are of antiseptic tissues or fabrics which require a bandage to secure them in position, and are admirable for the purpose, provided the man is not

disabled in one of his hands, in which event he would find difficulty, if unassisted, in applying the dressing. Moreover, a bandage encircling a limb, may, if the man is obliged to remain many hours without aid, become a discomfort, if not an injury, to a rapidly swelling limb.

To avoid these objections, I have devised an "Adhesive Antiseptic Occlusive Dressing," impervious to fluids, which adheres without warming if pressed to the part, and contains, in its central portion, a quantity of dry antiseptics concealed under antiseptic lint, which is firmly secured to the face of the plaster, which is also covered with two overlapping pieces of antiseptic gauze so folded as to be easily removable with one hand or the teeth, and the whole enveloped in Paraffine paper.

Four of these plasters are contained in a tin box, which is tightly closed by a hinged cover, and can be opened with one hand. (Fig. 1.) The Box is labeled as below, and the directions on its reverse are shown below the Drawing.*

FIG. 1.

On the Reverse is read—

> These Pads are antiseptic and firmly fixed to antiseptic plasters, which are impervious to water or the fluids of the body. They will adhere firmly in any temperature without bandage. A man can apply them to himself if he has his teeth and one hand remaining. By joining the four pads together you have an occlusive antiseptic dressing large enough for any wound likely to be met with, viz., 8 x 12 inches. The antiseptic gauze which covers the plaster can easily be rolled up by the fingers into tampons with which to plug the wounds, in case of hemorrhage. The packet is trifling in size and weight, and is impenetrable to bullet at ordinary range, and is therefore a protection to the person, and should be worn in the left breast-pocket.

Packets of two sizes are furnished. The larger (Fig. 1), containing four dressings, measures $3\frac{1}{2} \times 2\frac{1}{4} \times \frac{1}{2}$ inches, and weighs $2\frac{1}{2}$ ounces. The smaller (Fig. 2, page 136) contains two dressings, and measures $3 \times 2 \times \frac{5}{8}$ inches, and weighs $1\frac{1}{2}$ ounces.

The dressings in the larger packet are each $6 \times 4$ inches, with a pad of antiseptic lint, $2 \times 2\frac{1}{2}$ inches, containing ten grains each of dry salicylic acid and iodoform deodorized with Coumarin.†

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* For the French and German translation of above Label see p. 300.

† *Coumarin* ($C_9H_6O_2$) is the chief constituent of Tonka Bean, and is obtained from the Melilotus Officinalis or the Liatris Spicata.—H. H. S.

The dressings in the smaller packet are each 4×4 inches, with a pad of antiseptic lint concealing the same amount and kinds of antiseptics as the larger package.

The lint and gauze are made antiseptic with bichloride of mercury, one to one thousand.

The object in furnishing four dressings in a packet is to provide for large wounds, such as are made by shell and large shot, and in the event of such a wound, the four dressings can be converted into one, measuring 7×11 inches, by overlapping their edges and filling up the spaces between the pads with the pieces of antiseptic gauze properly folded.

The man should be instructed to unfold the plaster, remove the paper and gauze, and to roll up the pieces of the gauze into tampons, to plug the wounds in case of hemorrhage, and to serve as drainage. Then to apply the plaster so that the antiseptic pad will cover the wound, and by pressing it firmly to the surface for a few seconds, it will adhere securely. The wound of exit, if there be one, is to be treated in like manner.

The packet is shot-proof at ordinary range, and should be carried in the left breast pocket.

FIG. 2.

BONTECOU'S SOLDIER'S PACKET
FOR FIRST WOUND DRESSING.
Contains 2 adhesive plasters 4x4 inches, each having on its face a pad of antiseptic bichloride lint, inclosing between its folds a powder of salicylic acid and iodoform, and the whole covered with bichloride gauze, all inclosed with paraffine paper in a tin box, with hinged cover—3x2x½ inches, weighing 1½ ounces.
DIRECTIONS FOR USE.—Unfold the plaster and remove the gauze from its face and use it as a tampon for the wound if desired, and apply the plaster to the part so that the antiseptic pad will cover the wound. Should the wound be large, two or more of the plasters can be joined together by overlapping their edges and filling up the space between the pads with the sheets of gauze properly folded. The plaster will adhere without bandage.

These Pads are antiseptic and firmly fixed to antiseptic plasters, which are impervious to water or the fluids of the body. They will adhere firmly in any temperature without bandage. A man can apply them to himself if he has his teeth and one hand remaining. By joining the two pads together you have an occlusive antiseptic dressing 8x4 inches. The antiseptic gauze which covers the plaster can easily be rolled up by the fingers into tampons with which to plug the wounds, in case of hemorrhage. The packet is trifling in size and weight, and is impenetrable to bullet at ordinary range, and is therefore a protection to the person, and should be worn in the left breast-pocket.

(The Drawings are fac-similes of the Packets.)

The packets are manufactured by Herman Guadendorff, No. 14 Second street, Troy, N. Y., U. S. America.

DEBATE.

In discussing the preceding papers on first wound field dressings, Surgeon JOSEPH R. SMITH, U. S. Army, said: My opinions are quite decided that it may be highly advantageous to the soldier to carry with him in campaign, some such packet as those now before us. It is requisite, however, that it be very light, not

weighing more than two or three ounces, and that its contents be antiseptic. It is not necessary that every soldier carry one—as the number of wounds received are not equal to the number of soldiers in a battle. The tendency of opinions in the U. S. Army is in this same direction. A board of officers which recently drew up regulations for a newly-organized hospital corps, adopted a regulation that a packet of this description be carried during the campaign by a certain proportion of the men. In regard to the propriety of this regulation there was no difference of opinion. As to the precise contents of the packet, there was not such unanimity of opinion, and the question was left open for future decision.

Whether justly or not, a large proportion of soldiers in battle experience a sense of security, when they feel that they have on their person the means of protecting themselves against the effects of wounds, because those effects are somewhat indefinite in their minds.

Prof. T. L. Dorsey Cullen, M. D., of Richmond, Virginia, said :—

I hesitate at differing from those distinguished surgeons who believe that the principles of antiseptic surgery can be successfully applied in all of its minutiæ, and particularly to the wounded of a great battle, upon the field where they fell, and I only do so because I have seen many battle fields, where ten thousand wounded have been left upon them—some in swamps, mountains and wildernesses—where there was no water to quench their thirst, much less to bathe their wounds, and where scorching suns and freezing rains have added to their agony and danger. Many thousands had to be left to die where they fell, owing to the impossibility of reaching them; and many more, for want of surgical assistance, have had simple wounds converted into fatal ones. In many cases the ambulance train and medical supplies have not "come up," or have been destroyed by a flank and rear attack of the enemy, and the surgeons have been obliged to rely upon the few appliances which they had carried with them on their persons, such as instruments, bandages, etc. In such cases as these some simple and more independent method must be adopted than the complex and intricate one of antisepsis. When we consider that antisepsis, to be of any value, must be perfect in every stage of its application, and that if "one jot or tittle" of the technique is not carried out ("The division of the twentieth part of one scruple; nay, if the scale do turn but in the estimation of a hair," as Portia cautioned Shylock in cutting his pound of flesh), then the whole fabric falls to the ground, and the golden opportunity of adapting other and simpler methods has been lost. Should the surgeon's knife fall upon the soldier's blanket, or should he not have scrubbed his nails and hands in an antiseptic fluid, should he, in fact, have neglected any of the most minute of the minutiæ in operating, then all his labor has been in vain. Now, sir, is it possible to carry out this intricate and cumbersome method under all the adverse circumstances of weather, place, time and opportunity? I believe not; "'tis true, but pity 'tis, 'tis true," sadly applies here, when we are deprived of the beneficent aid of antisepsis, which in civil practice has been so wonderful in its results.

The question is naturally put to me now, what is, then, the safest and most expeditious plan suited to the occasion, when we see that the antiseptic plan is not available?

There are several which have been used in great wars of recent times, viz.: the occlusion simple, occlusion antiseptic, and the open method simple and the open method antiseptic.

The open method is one which we must exclude in all cases requiring transporta-

tion, while it may do well in cases where immobility can be preserved. The other, I have endeavored to show, would be impracticable in many cases; and we are then thrown back upon the occlusive form and simple, as one which depends less upon time, place and circumstances for its success, than others, and which can be made aseptic from the vivifying action of the blood, and of the blood clot that covers the wound when it is put up.

The great protective power of blood to a wound I learned to value only in the war, and had no cause to reject its application in the large number of wounded that fell to my lot to attend. After an amputation, the blood that is effused from the inside of the wound, should be allowed to remain over the line of the incision, and, after a drainage tube has been left in the lower part of the stump, the leg should be bandaged equally, to support it and keep down muscular action, more than anything else. The dressings should not be removed for several days, unless there are evidences of suppuration going on in the stump, when they should be removed and the interior of the stump gently washed out with antiseptic fluid—mercurial chloride—the drainage tube put in and again surrounded by an antiseptic gauze bandage. The arteries should be twisted or tied with antiseptic catgut, or, if that is not at hand, silk soaked in boiling water or any germicized fluid. The best hæmostatics are rest and pressure; and the best antisepsis, if it can be called so, immobility. Let the badly wounded be moved as little as possible, and prohibit the exploration of the wound by the fingers of the curious surgeons and attendants.

The little package of antiseptic materials before us, sent by Esmarch, or that in the tin box, as suggested by Dr. Bontecou, representing what is designed to be carried by the soldier on his person—to be used when wounded—might answer if the soldier could be made to carry it as required; but any one who knows how the soldier throws away every superfluous weight, except those which he is obliged to use for his defence, viz., ammunition, blankets and rations, will acknowledge the impracticability of this plan.

The American soldier—at least the Confederate with whom I served did—threw down his blanket and other impediments as soon as a line of battle was formed, and moved to the attack, or on the retreat, many miles from the place they were, never to see them again perhaps, or if so, not for many days. In case the antiseptic dressings were in the blanket or knapsack, they were lost to him, or at the best until the time for their efficient application had passed, and the wound had become septic.

In small commands, and in a thickly populous country like Germany and France, where the situation is more like those which are found in civil practice, the antiseptic plan might be carried out. I am aware of the success of military surgeons in the use of antiseptics in the European wars of the last few years, notably the Russo-Turkish and Bulgarian, but the cases have been correspondingly few in comparison with the number of wounded who could not be so treated. The cases treated by Reher in the Russo-Turkish and Roumanian war, and more especially from Plevna, represent the power of antiseptics secondarily applied, to recover a wound from the effects of sepsis, rather than illustrations of the primary treatment on the field; indeed, the fact that the wounded were carried in ox carts over mountainous roads for four or five days, proves, more than anything else, the virtue of the simple occlusion and blood protection. It is deplorable that true antiseptics cannot be applied to every wound, no matter how large the number; but as yet we can only hope that the untiring efforts of surgeons to perfect the art will reward them with the desired results.

Dr. Wm. Varian, of Titusville, Pa., remarked :—

I take exception to the view of Dr. Cullen as to the impracticability of the soldier's carrying and using the antiseptic package on the field of battle. If the soldier was drilled in its use, and had served long enough to see its value, it would not, in my opinion, be abandoned, and it would furnish a prompt means of securing the occlusion of the wound by the blood clot, and so preventing sepsis, which would convert a simple wound into a source of serious danger.

In reference to the preceding papers on antisepsis in the field and the primary dressing, Surgeon-Major Langridge's opinion was that the less a wound was interfered with on the field, the more likelihood there was of its remaining aseptic. He could not go so far as Dr. Cullen, and trust entirely to the blood clot, but he agreed with him that with a large number of wounded it was quite impracticable to pursue a complicated antiseptic treatment.

He coincided in the opinion that the wound should on no account be examined and fingered, and that no washing or purification should be attempted at the station. He would at once apply the simplest antiseptic dressing obtainable, and in his opinion the best is a pad of antiseptic wool. This is easily carried, easily applied, fits closely to the part, is not quickly permeated by the oozing, and so can be kept on for a considerable time without any danger of the wound becoming putrid. This pad at any rate would protect the blood clot and prevent any septic material reaching the wound after its application. Practically, in a great number of cases, it would suffice to produce asepsis.

Surg.-Maj. Langridge has had considerable experience in the use of antiseptics at the Royal Arsenal, Woolwich, England, to which he is attached. This establishment employs about 10,000 men. The number of injuries treated there in 1885 was over 4300, and about the same in 1886. He has tried thoroughly the chief antiseptics, viz.: iodoform, boracic acid, salicylic acid, eucalyptus, carbolic acid and corrosive sublimate. He has obtained the best results from the latter two, and as the corrosive sublimate is not volatile he would prefer it in the form of Sal Alembroth, which is the chief dressing used at present by Sir Joseph Lister to impregnate the pad of wool which he thinks is the best and most practicable first dressing for an army in the field.

Dr. George L. Porter, formerly Surgeon U. S. Army, said :—

Iodoform is easily applied and it is of very great importance; if alone employed it would prevent very much of the usual unfortunate results which complicate gunshot wounds. He was himself wounded, accidentally, by a small rifle ball; the ball remained in the wound; the tract of the missile was filled with the dry powder of iodoform, and the dressing—ordinary cloths—remained permanently. The wound healed without suppuration, pain, or impairment of motion.

Dr. Carnochan, of New York, agreed with the previous speaker, Dr. Cullen, in regard to the primary treatment of wounds in the field; although recognizing the value of antiseptic surgery in private and hospital practice, he realizes the impracticability of their use in the field, where many of the conditions upon which the success of such dressings depend are wanting. The soldier becomes too indifferent, by reason of frequent exposure to danger, to give heed to such details and appliances as the antiseptic treatment demands. When he is transported by ambulance, or otherwise, to the field hospital, and comes under the care of the surgeon, the time has then come for such treatment, as he is, by reason of improved advantages, amenable to antiseptic treatment.

# THE PRIMARY TREATMENT OF GUNSHOT WOUNDS.

## DU TRAITEMENT PRIMAIRE DES BLESSURES D'ARMES À FEU.

## ÜBER DIE ERSTE BEHANDLUNG DER SCHUSSWUNDEN.

BY B. A. WATSON, M. D.,

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It must be admitted that the first treatment of gunshot wounds on the field is a subject of vast importance, since it pertains alike to suffering humanity and the well-being of nations. It, therefore, behooves us to consider thoroughly the means by which the work can be successfully accomplished ; but the limited space allotted to this essay will compel me to confine my comments to the more essential factors of this subject. It ought, however, to be remembered, that the means employed should always be selected with express reference to the object which is sought to be accomplished.

The military surgeon ought to be a skilled and able physician, a brave, active, and determined man, well acquainted with the rules of health and the management of hospitals, and, furthermore, a true soldier. It is unquestionably true that the medical gentlemen who enter upon the practice of their profession in our armies are possessed of a more thorough knowledge of the duties required of them than any other class of commissioned officers. This is especially the case in the volunteer corps of the army. But attention has already been called to the fact that something more than a thorough medical education is indispensable in a military surgeon. He ought, likewise, to possess all the essential characteristics of the true soldier, since he must often be exposed to danger, and endure the hardships which are inseparable from war.

Furthermore, it should be recognized that the efficient management of the medical department of an army demands the exercise of the same skill on the part of the chief medical officer, in the selection of his subordinates for the performance of their varied duties, as must be exercised by a commanding general in the field, who expects to secure the best possible results. It is, therefore, necessary that their selection should be made with especial reference to the fitness of the medical officer for the performance of the particular duty required of him.

It is now fully apparent that the surgeons who are selected to accompany their commands to the field of action should possess a high degree of personal courage and much executive ability, which should likewise be combined with professional knowledge and tact, since the duties must be performed in close proximity to the troops engaged in battle, while the value of the services will materially depend upon their coolness and the proper exercise of good judgment. The first duty required of the surgeons who are to render primary professional aid to the wounded on the field of action, will be the selection of a suitable spot for the performance of this service. This location should be chosen with proper reference to its accessibility for the reception of the wounded, their safety, and their removal to the field hospitals, which are commonly situated about two or three miles in the rear of the troops that are actually engaged.

It will be readily understood that the peculiarities of the field, whether level or hilly, wooded or cleared, and likewise the presence or absence of fortifications, are conditions which must influence the military surgeon in locating the field stations and the field hospitals. Furthermore, the presence of an abundance of pure water is almost indispensable to the proper care and comfort of the wounded in the field hospitals, and is also very desirable at the field stations.

The wounded reach the field station either by walking or being brought there by

the stretcher bearers; and, after having received the proper surgical treatment, they are permitted to continue their journey on foot; or, in those cases in which this exercise would be impossible or injurious, are placed in the ambulance and transported to the field hospitals.

The selection and supervision of the field stations during an engagement is a subject of so much importance to an army, that it should receive the careful consideration of military surgeons, since this work has not yet been thoroughly systematized. The only instructions on this subject which were operative in the Army of the Potomac, during the late War of the Rebellion, are found in Surgeon Jonathan Letterman's circular, dated October 30th, 1862.

He says that "Those" (surgeons) "who follow the regiments to the field, will establish themselves, each one at a temporary depot, at such a distance or situation in the rear of his regiment as will insure safety to the wounded, where they will give such aid as is immediately required; and they are here reminded that while no personal consideration should interfere with their duty to the wounded, the grave responsibilities resting upon them render any unnecessary exposure improper."

It will be readily perceived that this circular leaves an efficient medical officer so far untrammeled by orders, that he may render important service to the wounded; but does it afford the necessary guarantee for the efficient and faithful performance of duty? Does it secure the best results which are attainable under the circumstances, and is it in perfect harmony with military discipline? These and many other similar questions may be properly discussed by us at this time. Having disposed of these preliminary questions, we may then proceed to the consideration of the aid to be given to the wounded at these stations. The primary object of this aid is to afford temporary safety to the wounded, and enable them speedily to reach the field hospitals with the least amount of suffering to themselves. How can these objects be the most satisfactorily secured by the surgical appliances at hand, and what are the operative procedures required?

It is very necessary that the surgeons at the stations should examine each wounded soldier promptly, in order that they may immediately arrest hemorrhages, which might, otherwise, speedily prove fatal. Furthermore, this examination is required for the purpose of discovering those cases which have been irrecoverably injured and most quickly die, since it is certainly unwise to attempt their removal to the field hospitals. This class should be made as comfortable as possible, under the circumstances, but may be left on the field after the examination has been made and the speedily fatal character of the injuries revealed.

It is, however, quite proper to caution the inexperienced surgeon, who may be held responsible for any error of judgment in this matter, and likewise suggest to him that he should in all these cases give the wounded soldiers the benefit of the doubts which he may reasonably entertain, and promptly forward them to the field hospitals.

The proper management of all cases in which there is a profuse hemorrhage, which may endanger life, demands prompt and careful treatment. Cases of this sort may be complicated with fracture of the bones, and under these circumstances their management becomes somewhat more difficult. The former require that the hemorrhage should be controlled, while the latter must be supplemented by the application of such appliances as will enable the soldier to reach the hospital with the least possible suffering, and without receiving additional injury in transportation.

There may be hemorrhage which will require the surgeon's attention at the field stations; although the primary loss of blood in cases of gunshot wounds is commonly very slight, even where large arterial trunks have been divided. The true explanation of this fact is found in the mechanical obstructions offered to the free flow of blood by the peculiarities of gunshot wounds. These injuries are essentially contuso-lacerated

wounds, in which contractions and retractions play an important part, while the surrounding conditions are most favorable for the coagulation of the blood and the formation of an obstructing clot. The pertinent question now is, what shall be done for the control of hemorrhage? We have already remarked the favorable conditions attending these injuries for the control of the bleeding, even from large vessels, which in many instances will be found to afford ample protection against the loss of blood until the unfortunate soldier shall have reached the field hospital; but there are some cases in which additional means should be employed. What shall it be? Is it necessary to ligate the bleeding vessel? The answer to the last query should be essentially negative; although it is barely possible that, in some exceptional case, where the opening in a bleeding vessel is so situated that it may easily be picked up with a tenaculum, a ligature may be placed about it as expeditiously as any other measure that could be employed, and would accomplish the object equally as well. However, it will be generally admitted that the ligation of bleeding vessels should not be attempted at the field stations, except in exceptional cases. The application of styptics should likewise be rejected, inasmuch as they accomplish but little good, and the same object can be much more readily attained by the use of less objectionable and more reliable means.

The hemorrhage arising from gunshot wounds in the face, head and upper extremities may be very readily controlled by the proper use of a compress. The compresses should be so prepared that they will not become a source of contamination—in other words, they should be rendered completely aseptic, and preserved in this condition until they are used. Similar precautions are required in the management of the wounds and the surrounding tissues. Therefore all foreign bodies should be carefully removed from these traumatisms at the field stations, and the surrounding parts made completely aseptic before the compresses and bandages are applied, or the wounded removed to the field hospitals. The necessity for prompt and careful action, is based on the fact that sepsis frequently occurs within a few hours after the receipt of a gunshot wound, and should aseptic precautions be neglected until after the arrival of the patient at the field hospital, it might then be too late to avoid disastrous consequences.

The various methods which may be advantageously employed for the accomplishment of this important object are worthy the careful consideration of all military surgeons, and consequently it is earnestly hoped that the discussion of this paper will put us in possession of much valuable information.

Having raised certain questions bearing on the aseptic preparation of the wound and its surrounding tissues, which should precede the application of compresses and bandages, we are now prepared to enter upon the consideration of the query, How shall these agents be employed in order to secure the desired results? It is self-evident to all that the answer to this question must be general, rather than specific. In other words, the application of the compress and the roller bandage should be so varied as to accomplish the object sought in each case. In some cases the proper application of the bandages will be found sufficient to control the hemorrhage, while in others it will be necessary to place a compress over the wound of entrance and exit made by the bullet. There are also other cases in which it is advantageous to firmly plug the wound with some aseptic material and then properly apply the compresses and the bandage.

The treatment of hemorrhage at the field stations is merely intended to control temporarily the bleeding, thus affording the wounded soldier ample time to reach the field hospitals safely, where he will promptly receive all the necessary attention. The advantage urged in favor of this method of procedure on the field is the fact, that it does not require any delicate manipulations nor the loss of much time on the part of the surgeon, while it certainly affords ample security against the further loss of blood, and likewise gives the greatest amount of comfort to the wounded, consistent with personal safety. If the bandage is to be applied tightly over the wounded portion of an

extremity, then its application should commence at the fingers or toes, in order to avoid the inconveniences arising from too great a constriction at the point of injury.

The plugging of wounds and the application of the compresses over their orifices, which are retained by the bandages, are preferred by the author, in most cases, to the placing of the compress over the proximal portion of the wounded artery and the application of the tourniquet, since the former affords greater security and is, likewise, less painful to the wounded. Furthermore, the application of the tourniquet demands the exercise of much skill and sound judgment; otherwise, it is very liable to increase the loss of blood by the compressing of the veins, while the circulation in the arteries remains unrestricted.

During the latter part of the War of the Rebellion, there was supplied to soldiers who were willing to accept it, a tourniquet, which they carried continually, and these instruments were occasionally employed in cases of gunshot wounds of the extremities. The applications were commonly made by an unprofessional comrade, who, in this way, uniformly greatly increased the hemorrhage. The bad results were so apparent, even to the private soldier, that they, after having employed these instruments a few months, voluntarily abandoned their use. There is no treatment in cases of gunshot wounds involving the vessels within the thoracic and abdominal cavities, which can be employed with much success at the field stations, and therefore the most important questions in these cases are the following: What cases shall be sent to the field hospitals, and how shall they be sent in order to afford them the greatest degree of security? In answering the first question it may be assumed that common humanity demands that the surgeons at the field stations should send all cases to the field hospitals for treatment in which there is even a slight chance of recovery, and therefore permit only those to remain on the battle field whose wounds are necessarily fatal, and must speedily terminate in death. In deciding this momentous question every doubt in the mind of the surgeon should be cast in favor of the wounded soldier, who is certainly entitled to the best surgical treatment which can be obtained under the circumstances. The surgeon on the field of battle having determined to send a case of penetrating gunshot wound of the abdomen or thorax to the field hospital should act with promptness, in order that the wounded may receive the early attention which is so necessary in these cases. It is likewise very important in such cases, especially when there is much internal hemorrhage going on, that the wounded man should make no physical exertion which would be likely to increase the danger from that source. There are, then, two important indications which should govern the action of the surgeon under these circumstances, viz.: the prompt removal of the soldiers to the field hospital, and the accomplishment of this object with the least possible physical exertion on the part of the wounded. It is necessary, therefore, that the field surgeon should give his personal attention to the matter, and thus secure the careful coöperation of the ambulance service. The surgeon should, therefore, consult promptly with the officers in charge of the ambulances at the field stations, in order that a careful driver may be secured, in whose ambulance the wounded soldiers should be then carefully placed by the stretcher bearers, and it will also be advisable to have an ambulance sergeant placed in charge of this vehicle, for the purpose of hastening the prompt and safe delivery of the patient. In fact, the field surgeon should always be able to control the ambulance service so far as to secure the safe and prompt delivery of these urgent cases at the field hospital in advance of the other wounded, who do not require the same promptness in treatment. The wounds of the thorax and abdomen which fail to penetrate those cavities do not here require any special consideration, since that which has already been said in regard to treatment of hemorrhage from gunshot wounds of the extremities, may be applied in these cases. Sabre cuts and bayonet wounds are of very infrequent occurrence, and may be commonly treated at the field stations in about the same manner as those wounds which we have

previously described. The wounds produced by cannon-shot and shell are, in many respects, similar to those which occur in connection with railroads and machine shops. The chief characteristic is the severe contusion and laceration to which the parts are subjected. The muscles, nerves, veins, arteries, and frequently the bones, are completely pulpified, which effectually prevents the occurrence of hemorrhage. The limbs are frequently torn asunder, and great gaping wounds are made in the soft tissues, involving the large blood vessels, but without being followed by any important primary hemorrhage. Therefore, the field surgeon will have very little trouble in the management of these cases. In fact, it rarely happens that any treatment is required for the control of hemorrhage, although the application of a compress to the wounded surface, and its retention by firmly applying a roller bandage over the parts, is often desirable, as it diminishes the muscular contraction, and thus affords some relief.

A similar necessity for promptness of action on the part of the field surgeon may exist in these cases, as in those of penetrating wounds of the abdomen and thorax. The prompt amputation of a limb which has been so severely injured as to require this operation, will frequently result in saving a life that would certainly be lost were the operative procedure delayed only a few hours. This class of injuries, in which there is still a probability of saving the life of the wounded soldier, should be regarded as urgent cases, and every possible effort made to transfer them to the field hospital as speedily as possible.

Having briefly considered the management of wounds at the field stations, which do not involve bones, we are now prepared to take up the latter class. The proper management of these cases demands, in addition to that which has been previously described, such treatment as will retain fractured bones in apposition, and, likewise, render them immovable. The surgeon should, in all these cases, promptly remove all foreign bodies, when this can be accomplished without the loss of much valuable time, even including the detached fragments of bone found in the wound. This preliminary operative procedure frequently facilitates the control of hemorrhage, and likewise diminishes pain. Furthermore, in some cases, it will, likewise, enable the surgeon to bring the fractured extremities of a bone into a more perfect approximation.

The time spent in dressing a wounded soldier on the field of battle, should be generally regulated, in some measure, by the number of cases which have accumulated at the field station, who are awaiting his professional attention; *i. e.*, his motto should be "the greatest good to the greatest number," or "attend to all, neglect none."

In most of the cases of compound fracture, the means already recommended for the control of hemorrhage in simple gunshot wounds will be found ample. The next question to be considered in our essay is, How should the fractured extremities be retained in apposition, and likewise rendered immovable? It will be generally admitted, that much more will depend upon the proper application of the appliances which have been provided for this purpose than upon the apparatus itself. In fact, a good apparatus can only secure good results when it is skillfully employed, while an ingenious surgeon may so skillfully employ the most crude implements, as to secure very satisfactory conditions. The nature of this service and the objects sought to be accomplished by this dressing, do not require an extensive surgical armamentarium.

The dressings applied at the field stations in cases of compound wounds, are intended to be merely temporary, while their object is limited to the obviating of the immediate danger, and affording the wounded present relief, likewise facilitating transportation to the field hospital without any aggravation of the injuries which already exist. In all these cases, care should be taken to avoid doing additional harm to soft parts by the fractured extremities of the bone, which are always more or less sharp and jagged, and therefore very liable to do damage to the surrounding parts. Hence the necessity for the avoidance of the movements of the fractured bones, which might, otherwise, still

further lacerate the muscles, and even sever the injured nerves, veins and arteries. The chief indications for treatment at the field stations in all cases of compound fractures are: the avoidance of hemorrhage, the prevention of septic complications and the immovable retention of the fractured bone in perfect apposition.

The first two indications are essentially the same in all cases of simple gunshot wounds, and their management has already been briefly described.

In order to meet the third indication, it will be necessary to apply some retentive apparatus; but the limited nature of this essay will not permit me to enter into any consideration of the different splints and the peculiar advantages of each in the management of the various fractures. I shall therefore only mention a limited number of retentive appliances which may be advantageously employed at the field stations for the accomplishment of our object, especially in the management of fractures of the bones of the extremities, while it should be always remembered that the field surgeon may be frequently compelled to employ any implement which may be accessible to him in an emergency.

The best splints provided for these cases are commonly made of wood or some metallic substances, since they can be very readily applied, afford the necessary support, and are not rendered worthless by heat or moisture. There may be provided for this purpose thin boards of various lengths and widths—with either flat or concavo-convex surfaces, made of some light wood of a suitable texture—which can be employed in these cases very advantageously, since the difficulties arising from the irregularities of the surface of the limb can be quickly compensated for by the application of cotton wadding, sheet lint, or some other material of a similar sort.

The Gooch flexible splint may be employed in these cases very advantageously when it is at hand. This splint is composed of thin, narrow strips of pine board, which are glued to thin leather. It is quickly applied and is easily fitted to various parts of the extremities, where it fulfills satisfactorily all the indications.

Esmarch's field splints are prepared somewhat like Gooch's flexible splint. These splints are composed of thin, narrow strips of pine or other suitable wood, which are glued firmly to a strong, unbleached muslin, in such a way as to leave parallel strips of board, with an intervening space of cloth. These strips of board may be cut so that their length will correspond to the width of the cloth, while their thickness need not exceed one-half an inch, and the cloth space may be fixed at one-fourth of an inch. This material may be prepared in any quantity, and then compactly rolled and taken to the battle field, where the surgeon would be able to promptly cut it into such sizes as he may desire to employ in the treatment of fractures. The cloth spaces greatly facilitate the cutting and fitting of the splint to the fractured extremity.

The grooved wood splints, which, in order to be advantageously employed at the field stations, must be made to fit the limb at least moderately well, are, therefore, scarcely applicable, since there would be much valuable time lost in selecting the proper size, and also much inconvenience in their transportation. Wood splints are preferable to those constructed of paper, felt, leather, etc., since they can be more readily applied so as to render efficient service.

Solidifying dressings cannot be employed at the field stations, for reasons which are obvious to all, and consequently need not be mentioned here. Metallic splints may, however, be advantageously employed in the treatment of both simple and compound fractures. These splints unquestionably possess some advantages over those of wood. The metallic splints are made of tin, sheet zinc, wire netting, and wire frames. The wire netting may be procured, and can be cut in any desired size and shape with suitable pliers. This material may be utilized on the field at least as conveniently as the sheet metal, and would be found equally serviceable.

The ordinary wire splints are commonly made for special fractures, and the chief

objection against their use at the field stations is found in the transportation and the loss of time required for the selection of one specially adapted for the treatment of the various cases. In the use of wire netting, the material may be cut in strips of suitable length and width; and when the fractured limb has been properly wrapped in two or three layers of woolen blanket, the splints may be firmly bound to the same with a roller bandage. This dressing may be speedily applied, and will afford all the relief required in the majority of cases, while transporting the wounded soldier to the field hospital.

In all cases of fracture involving the upper third of the femur the splint should extend from the axilla to the sole of the foot, or at least be firmly bound to the body at some point above the hip joint. This is readily accomplished by the application of a roller bandage, which should be carried up over the hip, and then passed several times around the abdomen, thus holding the splints in firm contact with the soft parts above and below the injured point; or, should the surgeon prefer it, he may employ a broad bandage over the abdomen. The wire netting may be used successfully even in these cases; but it will be found less convenient than a suitable board. However, in treatment of fractures of the upper extremity, where the surgeon may desire to employ an angular splint, the wire netting will be found better adapted to this purpose.

We have now directed attention to the management of fractures at the field stations when the surgeon is provided with ordinary supplies; but it frequently happens that by the vicissitudes of war he has been deprived of splints, and likewise of the material from which he has been accustomed to make them. The surgeon should be prepared to meet these emergencies by the utilization of the material which may be within his reach: for instance, if the field station should happen to be located in the woods, a very serviceable splint may be constructed with the saplings, which may be bound together with cords, or even the roller bandage, thus securing the necessary support for the fractured limb, while in other cases—especially during certain seasons of the year—the bark of certain trees may be pulled from their trunks, and these grooved splints may be utilized for the support of fractures. In the other instances, if a member of the pioneer corps can be found in possession of an axe, excellent splints may be riven out of the trunks of cedar trees and any other similar wood.

In the absence of the forest products, the implements of war may be utilized to supply the necessary support in the case of a fractured bone of the extremities. The ordinary musket may be used in the place of a more neatly constructed Liston splint, by placing the breech of the gun in the axilla, while the barrel of the same implement is extended along the fractured limb and firmly bound to it, thus affording the necessary support.

While bayonets may be employed in place of the Dupuytren's splint in the case of a fractured leg, even the sabre blade, the sword scabbard, and likewise the bayonet scabbard, may equally be utilized in the treatment of many fractures of the extremities. In cases where only one of the lower extremities has been fractured, the sound leg may be used for the support of the fractured one, by firmly binding them together by the application of a roller bandage, while in the case of a fracture of the humerus, the same object may be accomplished by firmly bandaging the arm to the wounded soldier's side.

The fracture of the forearm should be properly supported by the application of a suitable splint, and then fixed at a right angle and placed in a sling, which may be retained in its place by tying it behind the wounded soldier's neck, or securely pinning it to his coat or vest at the proper point. These slings may be readily extemporized from the soldier's blanket, or some portion of the soldier's clothing, or even the common roller bandage may be used when better material has not been provided for the purpose.

The soldiers suffering from fractures of the upper extremities frequently prefer to

walk to the field hospital rather than be conveyed there in an ambulance, and when this is the case, the dressings should be made with a proper reference to their expressed wishes.

It has already been observed that, under all circumstances, the surgeons on the field may render valuable assistance to the wounded, in preparing them for a safe and speedy transfer from the field of battle to the field hospital, even without performing any important, cutting surgical operations.

We have not previously mentioned the surgical armamentarium which will be required, that the field surgeons may perform their duties satisfactorily, but will here state that the surgeons may very satisfactorily perform their duties when supplied with an ordinary pocket case of surgical instruments, and the regimental surgical knapsack, which is commonly carried by an assistant to the regimental hospital steward, in the United States Army.

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# THE IMPORTANCE OF THE GOVERNMENT SECURING AND PRESERVING VITAL STATISTICS IN THE ARMY AND NAVY, FOR THE BENEFIT OF SUBSEQUENT APPLICANTS FOR PENSIONS.

## DE L'IMPORTANCE POUR LE GOUVERNEMENT DE COMPILER ET PRÉSERVER LES STATISTIQUES VITALES DE L'ARMÉE ET DE LA MARINE POUR SERVIR DE DOCUMENTS RELATIFS AUX DEMANDES SUBSÉQUENTES DE PENSIONS.

## DIE WICHTIGKEIT DER SAMMLUNG UND VERWAHRUNG EINER LEBENSSTATISTIK IN DER LAND- UND SEEMACHT DURCH DIE REGIERUNG, ZUM BESTEN SPÄTERER BEWERBER UM PENSIONEN.

BY ELI A. WOOD, M.D.,

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It is only recently that any government has undertaken to collect and preserve medical and surgical war records. For centuries, individual army surgeons have gathered private statistics, and to their efforts we owe, largely, the present state of military and naval surgery and medicine. The governments of Great Britain and France, respectively, prepared and published partial records of the Crimean War. On a larger scale, the United States Government collected a mass of clinical histories, which is published in the many volumes entitled "The Medical and Surgical History of the War of the Rebellion." The latter government also collected and arranged a vast amount of material, as found in the Army Museum at Washington.

But excellent as these works are, and complete though they may be as far as individual narrative is concerned, yet they are incomplete; the medical history of any war has yet to be written, and the clinical records of any war have yet to be kept. And yet the meagre records of Great Britain, France and the United States have taught the world a great lesson, a lesson that should be quickly learned and never forgotten. That lesson shows how much has been lost by past negligence, and how much science and humanity may gain by accurate methods in the collection and preservation of the clinical statistics of wars.

Not excepting the claims of statesmen and warriors, the greatest good that can come of the evil of war is the possible good to medical science and art. Hitherto the surgeon stood amid scenes of carnage solely to repair, as best he might, the broken soldier, just as the blacksmith might mend the broken cannon. Hitherto a broken soldier, sailor, or musket was cast aside as useless in the estimation of nations. Military medicine and surgery, until quite recently, never had the fostering care of governments, and even that fostering care has been grudgingly bestowed, and defective in the work achieved. What statistics have been secured are the result of the most persistent and importunate efforts on the part of the medical corps, and the entire work has been done by the unrequited toil of individual members of the medical profession. In no instance has any government given hearty and adequate facilities for the collection and preservation of a full and faithful record of the clinical facts and history of any war. The lesson must be kept before nations, until they shall have learned that the clinical histories of wars are as important as their political and military histories.

While we may deplore the great lack in the completeness of medical war records, much pride and satisfaction is felt in the work done by the United States. Defective though it is, it is a glorious record, and is complete enough to demonstrate what a vast good may be done in that direction. That work was done mainly by the medical profession, done in the face of bitter opposition, done by breaking down prejudice and wringing reluctant appropriations from a stubborn government. That work stands to-day as proud a monument as the marble spiking the fields of Gettysburg, more enduring than martial trophies, and almost equal in good to Union soldiers preserved and fraternized by the wounds and sufferings it records. That monument is too universal in its significance to be boastingly paraded by Americans before such an assemblage as this. That monument was erected by the medical profession—a profession not trammeled by creed or hemmed in by geographical lines. It stands as the glory of military surgery; beneath its shadows may gather the surgeons of all countries and all climes; on its pillars may be fittingly inscribed, along with American, the names of the illustrious surgeons of all the nations of the earth.

But even this record shall pale when all governments shall hereafter collect and preserve full and complete medical records of all wars. When that system is adopted we may confidently look for accurate and precise methods in military medicine and surgery, and the horrors of war be shorn of much of its terrors.

The duty of governments toward those honorably discharged from its military service is well recognized, and the manner of discharging that duty fairly well determined. In this country, the obligation is cancelled by a Pension, or admission to a soldiers' or sailors' home. The aim of the government is to act justly and impartially. And yet, because of a bad beginning, it is impossible for the United States to mete out exact justice to its discharged and disabled soldiers. So many wrongs and errors are possible, that injustice is not infrequent, and is often flagrant. The evils arose because there were so many cases of neglect to keep and preserve clinical records. The Pension Bureau of the War Department has labored hard to remedy the defect, and has succeeded in reducing it to its minimum, but most of the evil is irremediable.

That the subject may be more clearly demonstrated, let us take a hypothetical case or two, which will fairly represent the evils as they practically exist:—

Soldier A was honorably discharged from the service. He came home suffering from wounds or other cause which produced a moderate degree of disability. But with his honorable discharge in his pocket, the joys of home and kindred about him, and the glorious welcome accredited to the nation's heroes swelling in his heart, he felt too proud and elated to apply for a pension. But as the years rolled round, the glamour of glory faded, and age and care crept about him; he began to feel the need of aid, and, conscious of the worthiness of his claim, he applies for a pension. He sets about

establishing his claim, and finds the whole labor and expense rests entirely on him, and that the government cannot give him any assistance whatever. He works his way step by step, by the most patient, laborious and costly procedure, searching for, arranging and presenting testimony to the Department in the effort to establish his claim, perhaps to find at last, failure. The applicant naturally turns to his regiment to find that no medical records were kept, that though he lay for weeks of a fever in such a camp, or was wounded at such a battle, there is absolutely not one particle of written history of his case. What should be as plain and as secure as the discharge in his possession has become obscure, and what should have been history, is only tradition. There was no clinical record kept by his regiment; had there been, his claim could have been easily, speedily and justly determined. In the absence of that record he resorts to such meagre and unsatisfactory evidence as tradition may afford; he seeks comrades whose very names he has forgotten, who are scattered hither and thither over our broad land, comrades whose addresses are unknown to him, and perhaps impossible to find. The war ended twenty years ago, and time makes wide gaps in regimental ranks, and fades the memory. The few comrades he does find, are perhaps not the ones who best knew his army history, or they have forgotten details which he himself so clearly remembers, and details which are all important in the establishment of his claim. If these comrades are conscientious, their statements will be vague, irrelevant, and sometimes contradictory, for even an honest memory may be treacherous. From them he gets nothing of value by which his claim may be established. He next turns to his regimental surgeon, who, if living, may be far distant, and who, in the absence of records, remembers very little of the case of soldier A. Disheartened and disappointed, after years of endeavor—expensive and laborious endeavor—he relinquishes his claim, and spends his days in brooding over the ingratitude of republics. He sends patriotism whistling down the winds, all because the nation did not secure his rights by keeping medical army records.

Soldier B also applies for a pension. Let us suppose that, though disabled, the cause of his disability was not got in the service. He is sincere, however, in the fact that he knows of others who get pensions, and who are no more entitled to them than he. He knows that his claim is fraudulent, but that knowledge only instigates him to prosecute his application with that much more unscrupulous zeal. It is a fact to be deplored that some men, otherwise fairly honest, do not scruple to take dishonest advantage of corporations and governments. It is also a fact to be deplored, that dishonest pension seekers do find tools ready and willing to aid in their disreputable work. By the testimony of sympathizing friends, soldier B succeeds in accumulating a mass of testimony which, to the Pension Bureau, is overwhelming, and he succeeds in obtaining a pension to which he is not entitled. This temptation to wrong the government, and the power of consummating that wrong, would be impossible if clinical records were kept by every regiment, in every barrack, and on every war vessel, wherein every soldier's and sailor's history is noted down, and which could be used as sufficient evidence in the establishment of every pension claim.

# THE IMPORTANCE OF INTERNATIONAL REGULATIONS FOR THE MEDICAL TREATMENT OF SICK PRISONERS OF WAR.

## DE L'IMPORTANCE DE RÈGLES INTERNATIONALES POUR LE TRAITEMENT MÉDICAL DES PRISONNIERS DE GUERRE.

## ÜBER DIE WICHTIGKEIT INTERNATIONALER BESTIMMUNGEN ÜBER DIE ÄRZTLICHE BEHANDLUNG KRANKER KRIEGSGEFANGENEN.

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War means waste, suffering, sorrow and death; it means corpses, invalids, cripples, widows, orphans, paupers; it means disorder, violence and "man's inhumanity to man."

In this desert of horror there are, however, many bright oases which gladden the eye and bring hope to the heart. Humanity has often risen above passion, seeking to prevent or alleviate suffering.[1] I will recall but one of these incidents, which redeems somewhat the long story of brutality.[2] On May 28th, 1859, Napoleon III ordered that all wounded prisoners should be delivered to the enemy *without exchange*, as soon as their condition would permit them to return to their country. He desired to diminish, as much as possible, the evils occasioned by war, and to give an example for the suppression of unnecessary rigors.

Twenty-eight years have since passed, nearly the life of a generation. How have so-called Christian nations during that time sought to diminish the evils of war, and suppress unnecessary rigors?

In the American war of Secession, 1861–'65, two large voluntary associations were formed, the Sanitary and Christian Commissions, which prevented and relieved much suffering. During the progress of this war, viz., on Feb. 9th, 1863, at a meeting of Sociètè Génévoise d'Utilité publique, at Geneva, M. Henri Dunant proposed the formation of relief societies, to continue in existence in time of peace, and be prepared to afford help to the *wounded* in time of war. An International Conference was thereupon called for October 26th; and from this came the Geneva Convention of August 8th, 1864, which on the 22d of August adopted ten articles.[3] The signatures of the representatives of twelve European powers were at once appended, and of other nations afterward; the United States of America, March 1st, 1882.

The first and sixth articles mention the *sick*. The first provides that sick and wounded soldiers in military ambulance or hospital, not held by military force, shall be considered neutral; and the sixth, that all sick and wounded soldiers shall be entertained and cared for, to whatever nation they belong. Another clause in the sixth article provides that the wounded who, after their wounds are healed, are found to be unfit for service, shall be sent back to their own country; and that the others may be also sent back on condition of not again bearing arms during the continuance of the war. Moynier[4] understands the word *others* to include all sick as well as the slightly wounded.

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[1] Moynier and Appia; "La Guerre et la Charité." Geneva and Paris, 1867. Translation by Furley. London, 1870.

[2] Dr. Evans; "Austro-Prussian Italian Conflict," Paris, 1868, p. 12. From the *Moniteur Universel*. See also Moynier and Appia.

[3] Moynier and Appia; also "Manual of Military Law," London, 1884, p. 885 *et seq.*

[4] "Etude sur la Convention de Genève," Paris, 1870, p. 198 *et seq.*

According to Bowles[1] the French delegation resisted the neutralization of the sick, declaring the object of the Convention was to secure that provision for the wounded only, and that they had instructions not to include the sick therein. The discussion seems to show, however, and so it was understood by Moynier, who took part in it, that the sick and wounded should be placed on the same footing. Nevertheless the title of the Convention was "For the Amelioration of the Condition of the *Wounded* of Armies in the Field." I think it is generally understood, and so Longmore[2] understood it, that the sick were of secondary importance, the provision for them being quite general; while the provision for the wounded was quite specific.

A further Convention was held at Geneva, October 20th, 1868, at which five additional articles were adopted, amending and enlarging those of 1864.[3] Davis states that these articles were acceded to by the Powers, but the "Reglement sur le service de santé de l'armée," Paris, 1884, p. 96, foot-note, states that they were not formally agreed to, but were voluntarily *adhered* to in the Franco-German war of 1870–'71. At the meeting of the Royal United Service Institution, London, April 1st, 1887, the chairman, Lord Thring, stated that it was his recollection that the articles had not been formally agreed to. The fifth article provides for the return of all wounded on condition of not taking arms during the continuance of the war; there was no special provision for the sick.

At the Brussels session of the Institute of International Law, at Oxford, September 9th, 1880, an elaborate series of articles was adopted, and the executive was instructed to notify the different governments of Europe and America, with a view to their adoption as a standard.[4] I am not aware, however, that any formal adhesion has been given.

In view, then, of the doubt as to the *status* of sick prisoners of war, Prof. Henry H. Smith, Chairman of the Executive Committee of this Congress, requested me to prepare a paper, presenting the subject for your consideration, and with conclusions upon which you might pass.

Inasmuch, however, as the surgeon not only attends cases of sickness and wounds, but his highest duty is to prevent their occurrence, so far as he has control, the question of *prophylaxis* must be considered. The medical officer whose register shows the smallest *morbidity* is, other things being equal, more worthy of commendation than his brother officer, whose register shows the smallest *mortality*. The scope of this paper must therefore be enlarged to include not only the treatment of *sick* prisoners, but also prophylaxis; and the absolute necessity for this consideration will appear by a study of the causes of disease among prisoners of war.

According to current International Law,[5] a prisoner of war is not *ipso facto* a criminal to be punished, but an unfortunate man captured in a laudable act. His captors have the right to detain him so that he may not assist his own government, and for this purpose may use all necessary precautions to prevent his escape; for it is his duty to escape if possible. They are bound to take such care of him as will preserve his life and health, including, therefore, proper and sufficient food, shelter, clothing,

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[1] C. S. P. Bowles; "Report upon the International Congress of Geneva for the Amelioration of the Condition of the Sick and Wounded Soldiers of Armies in the Field." Aug. 8, 1864, p. 42 *et seq.*

[2] Moynier and Appia; Translation, p. 361.

[3] Davis; "International Law," New York, 1887, p. 432 *et seq.* See Jour. U. S. Institution, London, 1887, p. 345.

[4] Davis, *op. cit.*, p. 442 *et seq.*

[5] Davis, *op. cit.*, p. 233 *et seq.* See also Revised U. S. Army Regulations, 1881, articles 1296 *et seq.*; Manual of Military law, *op. cit.*, p. 296 *et seq.*

fuel and exercise, and medical treatment. If these conditions had been observed during the last quarter of a century, there would have been no need of this paper. A prisoner may be compelled to labor consistently with his rank, and provided that he takes no part in military operations. His labor helps to pay for his keeping and affords him the needed exercise. At the proper time he is paroled or exchanged according to a cartel agreed upon by the belligerents. But there is no obligation to parole or exchange in the absence of a cartel.

The record of treatment of prisoners of war is to a certain extent a record of disease and death from starvation or thirst, exposure to cold and rain or to excessive heat; confinement in crowded and badly lighted and ventilated prisons; physical violence from brutal keepers; a record of robbery of personal property, and misappropriation of funds and stores; and, saddest of all, a record of fatal *homesickness.*

The prisoner, unarmed, helpless, must submit to whatever treatment his keepers may subject him; must endure their indifference and neglect. While it is not probable that any civilized government would deliberately seek to injure or destroy its prisoners, it is certain that commanders and their subordinates, of prisons, are not all and entirely innocent.

Theoretically, prisoners are not exposed to such causes of disease and injury as are inseparable from the march, bivouac and battle field. Theoretically, their sickness and mortality should be but little greater than of an army on a peace footing, and much less than one in actual hostilities. But official returns do not bear out this theory; a fact which I will now show by three examples, two from the American civil war and one from the Franco-German War.[1]

There were 476,119 Confederate soldiers captured in the war of 1861–1865; 248,599 were paroled on the field, and 227,570 remained, detained as prisoners; of these 30,152 or 13.25 per cent. died.[2] 212,490 were confined in military prisons; of these 23,222 or 11 per cent. died.[3] Since there were less than 200 deaths in the prisons from wounds and injuries, it follows that over 23,000 men died from disease, much of which might be classed as preventable. Most of the men were doubtless able to walk into their prisons; not absolutely well, but with disabilities probably not inevitably fatal. The mortality must, therefore, be largely sought in improper prison conditions, air space, food, clothing, shelter, fuel, indifference and neglect.

The largest mortality was at Elmira, New York. In the twelve months of its existence as a prison, 12,147 were confined; 2980 or 24 per cent. died; one man in four; the condition of the remaining three who were released can only be conjectured.

I am indebted to advance sheets of the third Medical volume of the "Medical and Surgical History of the War of the Rebellion," edited by Surgeon Chas. Smart, U. S. Army, for information regarding this prison.[4] It was established in July, 1864, on the river bank, near the town, and was believed to be in a healthy situation; sandy soil on coarse gravel; good underground drainage. 20 barracks which had been used for Union soldiers and were intended to accommodate 100 men each, and 10 new barracks

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[1] There is in course of publication an official reprint of orders and correspondence pertaining to the war of 1861-'65; but the portion devoted to prisoners of war is not yet printed, and will not be, probably, for some time to come. There are, however, some official reports in print and accessible, more especially in the Library of the Surgeon General's Office, U. S. Army, Washington, and which contain the data I present. I refer especially to Report No. 45, 40th Congress, 3d session, 1869; the three Medical volumes of the "Medical and Surgical History of the War of the Rebellion;" and to the "U. S. Sanitary Commission Memoirs, Medical volume," New York, 1867.

Report 45, *op. cit.*, pp. 278, 774 and 778.

[2] *Ibid.*, pp. 768 to 770.

[4] 3d Medical volume, *op. cit.*, p. 56 *et seq.*

for 148 men each, were occupied. In August, 1000 tents, each for 5 men, were pitched; total accommodation 8480. The barracks were well lighted and warmed; ridge ventilation. The bakery issued 6000 to 7000 rations daily. Full prison ration; good water. Prison area, 35 acres, fenced around. The Inspector, July 15th, 1864, says: "They are absolutely without the necessary medical and hospital supplies. The sick lay in naked bunks, from inability to obtain straw." In August the supplies were reported abundant, but sickness and mortality great; attributed by the Inspector to the broken-down condition of the prisoners when received. Strength 9171; 1111 under treatment. One surgeon in charge; 11 or 12 assistants. 624 cubic feet air space per capita.

In October there were 9063 prisoners; 3873 in barracks, 5190 in tents; 1560 on sick report. Air space per capita in large barracks 111 feet, in small barracks 92.5 feet. The hospital was, therefore, enlarged; air space in new wards 654 feet, in old wards 342 feet.

November 11th, additional wards, giving 654 feet space.

During the winter 24 new barracks were built; used instead of tents; air space 180 feet. 5934 prisoners; 1738 or nearly 30 per cent. on sick report. The chief causes of death were[1] diarrhœa and dysentery 1394, pneumonia and pleurisy 773, eruptive fever 388, continued fever 140.

At first the drainage was into an open pond inside the camp, forming what was called a perfect pest-hole; this pond was afterward drained. The clothing and blankets were insufficient; it is said that a supply of blankets was received from the Confederate government. The Inspector says, January, 1865, "The type of disease among the prisoners is that resulting from overcrowding; there is no acute disease; everything assumes a typhoid type."[2] "The condition of the prisoners is pitiable. The diseases are nearly all of the typhoid type, and much of the sickness is justly attributable to crowd poisoning. In addition to this, the clothing during the winter was insufficient. The deep mud prevents exercise of the prisoners in the open air; and there is no occupation for most of them to relieve in a measure the depressing influences of prison life. The Fort Fisher prisoners, especially, arrived in cold weather, very much depressed, poorly clad, and great numbers were soon taken sick with pneumonia and diarrhœa, rapidly assuming a typhoid type."

Dr. Smart makes the following comments:[3] "From the reports of the Medical Inspectors it is evident that, while a large mortality was undoubtedly referable to over-crowding, insufficient hospital accommodation and insufficient protection from the cold of a northern climate, in the earlier history of the Depot the main influence underlying all these and raising them into strong relief, was the broken-down condition of the men at the time of their confinement. Most of them suffered from diarrhœa of a chronic character." 1376 of the 1394 deaths from diarrhœa were of the chronic form. "The depression of spirits consequent on defeat and capture, the home-sickness of the prisoners, the despondency caused by scenes of suffering around them, the gloomy and vacuous present, and the uncertainty of the future, conspired to render every cause of disease more potent in its action." "The broken health and broken spirits of the inmates were the main factors in the production of disease and death."[4]

According to the best calculation, there were 2,335,951 men in the Union army, 1861-1865[5]. The deaths approximate 310,000,[6] or 13 per cent. of those serving. That is to say, the rate of mortality of Confederate prisoners, not paroled on the field, was equal to the rate of mortality of the Union army; and the rate of mortality of the prisoners in military prisons was but two per cent. less.

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[1] 3d Medical volume, *op. cit.*, p. 46.
[2] *Ibid.*, p. 57.
[3] *Ibid.*, p. 63.
[4] *Ibid.*, pp. 70 and 71.
[5] Report 45, *op. cit.*, p. 774.
[6] 1st Medical volume, *op. cit.*, p. xxxiv.

The official records of the Confederate Government were largely destroyed by the accidents of war. The best information in regard to the army medical service is from the pen of Dr. Joseph Jones, of New Orleans, Confederate surgeon. He estimates that there were 600,000 men in that army ;[1] of whom 200,000 died of disease and wounds; 200,000 became prisoners of war ; 100,000 were lost by desertion, etc. ; and 100,000 remained effective at the close of the war. His estimate of prisoners agrees closely with that of the Adjutant General of the U. S. Army. If we add Dr. Jones' estimate of deaths, to the deaths of prisoners, we have 230,000 deaths, or 38 per cent. of the army of 600,000 in four years of war—three times the rate of mortality of the Union army. But this high relative rate is diminished somewhat by the fact that the *personnel* of the Union army was changed by accessions much more frequently than was that of the Confederate army. Diarrhœa, dysentery and scorbutic diseases were relatively more frequent in the Confederate army.

There were 188,145 Union soldiers captured by the Confederates.[2] 154,330 of these were paroled, but how many were paroled on the field is not stated, and it is not known, therefore, for what number to calculate the mortality. There were 36,401 graves of Union prisoners. This would give a 19 per cent. mortality in the total of prisoners, or 38 per cent., if half were paroled on the field. In any event, the smallest possible mortality of Union prisoners was 19 per cent., and the actual fact must have been greater. The probability is that the mortality rate was equal to that of the Confederate army itself—38 per cent.—or about three times as great as was the mortality of Confederate prisoners. The number of deaths recorded was 26,328.[3]

On account of destruction of records, the number of prisoners in Confederate prisons cannot be stated. "Little statistical information can be gained for any of the large depots except Andersonville and Danville,[4] beyond the number of graves at the close of the war." The largest mortality was at Andersonville, 13,705 deaths, and Salisbury, N. C., 12,112 deaths. At the latter place but 78 graves could be identified.

The Andersonville prison has gone into history. Its commandant was judicially executed on account of alleged cruelty to prisoners. The best information concerning this prison is from Dr. Jones.[5] He was directed by the Confederate Surgeon General to examine and report upon the diseases of the Union prisoners confined there. He states[6] that he "desired especially that the report should never see the light of day, because it was prepared solely for the eye of the Surgeon General of the Confederate States army ; and the frank manner in which all the subjects had been discussed would only engender angry feelings and place weapons in the hands of the victors." The end of the war found the manuscript in his possession, unreported. We are told that the situation of the prison was naturally healthy, and in a district where food was most abundant. It consisted of 17 acres, afterward enlarged to 27 acres, enclosed by a stockade of logs. A stream of water ran through it, the upper part of which was used for drinking purposes ; the lower part for defecation and urination. The banks were low and subject to overflow. Before entering the prison the stream was somewhat contaminated by the excreta of the prison guard ; by the time of its exit it was a "filthy quagmire." In June, 1864, the area, including the part uninhabitable, was less than

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[1] *Richmond and Louisville Med. Jour.*, 1870, IX, p. 257.

[2] Report 45, *op. cit.*, p. 774.

[3] *Ibid.*, p. 228.

[4] 2d Medical volume, *op. cit.*, p. 31.

[5] Dr. Joseph Jones, U. S. Sanitary Commission Memoirs, *op. cit.* See also Report 45, *op. cit.;* Dr. R. R. Stevenson, "The Southern Side," Baltimore, 1876; and Med. Inspector A. C. Hamlin, U. S. A., "Martyria," Boston, 1866.

[6] San. Com. Mem., *op. cit.*, p. 477.

four square yards per man. August 5th,[1] the prison was so crowded that the area per man was less than six square feet. All the offices of life, cooking, washing, defecation, urination, exercise, sleep, had to be within this space. The daily ration consisted of bacon, one-third pound; corn meal, one and one-quarter pounds. This meal was often prepared from corn ground with the husk. The supply of vegetables was exceedingly scanty. There were no barracks, and only a few old tents; the prisoners dug caves in the ground for shelter. There were no trees; those which existed at the opening of the prison soon disappeared for use as firewood. There was no room for exercise. No soap was issued for washing. Their clothing was insufficient to protect them from the weather; many were nearly naked. The hygiene and police were poor. The prisoners constituted their own police force, for the guards were insufficient.

The hospital was badly situated sanitarily; was poorly supplied with facilities; too much crowded; was sometimes without medicines; and the medical attendance was insufficient.

In less than seven months from the opening of the prison, out of 40,611 prisoners admitted, 9479, or 23.3 per cent., died; about the same rate as at Elmira, N. Y. 45,613 men were admitted during its entire fourteen months of existence; of these 12,912, or 28 per cent., were registered as died; but there were 13,705 graves, which increases the rate to 30 per cent.[2] 17,875 were admitted to hospital in the first twelve months; the disease was specified in all but 946 cases; there were 11,806 deaths, or 73.7 per cent., of those admitted. Many of the cases, however, were already dead when entered on the hospital register. 5605 deaths were from diarrhœa and dysentery, 3614 from scurvy, 322 from pneumonia.[3]

Dr. Jones made a preliminary report October 19th, 1864, in which he says, "Diarrhœa, dysentery, scurvy, and hospital gangrene were the diseases which have been the main causes of the extraordinary mortality. The origin and characters of the hospital gangrene which prevailed to so remarkable a degree, and with such fatal effects, among the Federal prisoners, engaged my most serious and earnest consideration. More than 30,000 men, crowded upon twenty-seven acres of land, with little or no shelter from the intense heat of a southern summer, or from the rain and dew; with coarse corn bread, from which the husk had not been removed; with scant supplies of fresh meat and vegetables; with little or no attention to hygiene; with festering masses of filth at the very doors of their rude dens and huts; with the greater portion of the banks of the stream flowing through the stockade, a filthy quagmire of human excrements, alive with working maggots generated by their own filthy exhalations and excretions; an atmosphere that so deteriorated and contaminated their solids and fluids, that the slightest scratch of the surface, even the bites of small insects, were frequently followed by such rapid and extensive gangrene, as to destroy extremities, and even life itself."[4]

Dr. Jones pleaded the exhausted condition of the Confederate Government, its bankrupt currency, its dilapidated and overburdened railroad lines, its insufficiency of troops for guard duty, and the desolation of the country, as reasons "for much of the suffering of the Federal prisoners."[5] It is due, however, to history to say that Col. D. T. Chandler, Adjutant and Inspector General C. S. A., who inspected this prison by

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[1] Report 45, *op. cit.*, p. 126.

[2] *Ibid.*, p. 776; Stevenson, *op. cit.*, p. 404.

[3] 3d Medical volume, *op. cit.*, pp. 33 and 34.

[4] San. Com. Mem., *op. cit.*, pp. 474 and 475.

[5] *Ibid.*, pp. 480 and 481.

order of the Confederate War Department, reported as follows:[1] "My duty requires me respectfully to recommend a change in the officer in command of this post—Brigadier General J. H. Winder—and the substitution in his place of some one who unites both energy and good judgment with some feeling of humanity and consideration for the welfare and comfort (so far as is consistent with their safe keeping) of the vast number of unfortunates placed under his control; some one at least who will not advocate deliberately and in cold blood, the propriety of leaving them in their present condition until their number has been reduced by death, to make the present arrangement suffice for their accommodation; who will not consider it a matter of self-laudation and boasting, that he has never been inside of the stockade, a place, the horrors of which it is difficult to describe, and which is a disgrace to civilization; the condition of which he might, by the exercise of a little energy and judgment, even with the limited means at his command, have considerably improved." This same commanding officer was shortly afterward promoted to the place of Commissary General of Prisoners.[2]

A cartel had been agreed to July 22d, 1862,[3] the fourth article of which provided that "all prisoners of war be discharged on parole in ten days after capture," etc., etc. If this provision had been carried out, the atrocious suffering and mortality of prisoners on both sides would not now form a part of history which all would be glad to forever erase. And in my opinion, nothing less than the provision of that cartel, namely, a *prompt parole*, can solve the problem of the proper treatment of prisoners of war.

The records of the French army and its prisoners, of the war of 1870–71, have not been published, if, indeed, they have an existence. Those of the German army and its prisoners are published.[4] I find that the number of sick and wounded of the German army *mobile*, was 596,856, with 43,182 deaths, or 7.2 per cent. of those on sick report, for less than one year of actual hostilities. This great mortality was from wounds—28,278 deaths, or 24.2 per cent. of all the wounded, while the mortality from sickness was but 3.1 per cent. of those taken sick. Of the German army *immobile*, there were 177,-599 on sick report, with 2428 deaths, or 1.4 per cent. of those on sick report, for twelve months. Of the French prisoners, 163,133 were taken sick, with 14,633 deaths, or 9 per cent. of the sick; wounded, 35,899, deaths, 3000, or 8.3 per cent. of the wounded; total sick and wounded, 199,031; deaths, 17,633; or 8.8 per cent. of the sick and wounded. In other words, the mortality from sickness among the French prisoners was nearly three times as great as that of the German army in active operations; and nearly seven times as great as that of the German army *immobile*. There were 4529 deaths of prisoners from typhoid disease, 1870 from dysentery, 1392 from pneumonia. The figures show what I want to emphasize, that a prisoner, *ipso facto*, has less chance of life than a soldier in the field, with all its exposures and dangers. Sir William MacCormac, then of the Red Cross, tells of a visit, September 6th, 1871, to a camp of 100,000 French prisoners, but few of whom had any cover, food was very scarce, and the ground was churned into mud, ankle deep by rain.[5] And Capt. R. Nevill, also of the Red Cross, in charge at Meaux, Dec. 17th, 1870, says: "The French prisoners arrive from all parts, and after hours of agony and hunger are sent on by train to Germany, in open trucks—at least most of the trucks are open, and those trains are so often shunted that they take between five and eight days to reach Nancy, the prisoners, of course, never leaving the wagons, and exposed night and day to whatever weather chance may send them, and hunger reaching almost starvation."[6] And yet I think it will be admitted that the

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[1] Report 45, *op. cit.*, p. 129. [2] *Ibid.*, p. 133. [3] *Ibid.*, p. 420.

[4] Sanitäts-Bericht über die Deutschen Heere im Kriege gegen Frankreich, 1870-'71, Berlin, 1886, II Band, "Morbidität und Mortalität," p. 169 *et seq.*, and p. 433* *et seq.*

[5] "Notes and Recollections of an Ambulance Surgeon," London, 1871, p. 76.

[6] Report of Operations of British National Society, p. 73.

German administration was better than ever before, of any nation in any war; perhaps as good as ever will be. Therefore, it seems to me that nothing less than a prompt parole, will secure proper treatment to prisoners of war.

I would add here that La Roche[1] estimates the entire French loss in the war, including those captured and transported in Germany, those interned in Belgium and Switzerland, and those surrendered at the capitulation of Paris; total, 963,000. The thought that nearly a million men, or the greater portion of that number, are at the mercy of captors whose indifference, neglect or inability may cause an enormous morbidity and mortality, shows the necessity for precise understanding among nations as to their duties in the matter.

The mere fact of being a prisoner, away from home and friends, among enemies, the future uncertain, the present a condition of helplessness, with lack of proper food, shelter, etc., tends to make men reckless of morals and life, developing all the baser passions.[2]

I submit the following conclusions:—

1st. A prisoner of war is not *ipso facto* a criminal, to be put to death or harshly treated. He is human, and should be so treated as to preserve his life and health.

2d. If captured while sick, or taken sick after capture, he should receive such treatment, both hygienic and medical, as will tend to promote recovery.

3d. If his captors are unable to afford the proper prophylaxis or treatment, he should be paroled and returned to his own government, which also should be bound to receive him.

4th. There should be international regulations specifying the minimum allowances of food, clothing, shelter, fuel, etc., of prisoners of war.

5th. The best ends of economy and humanity would be attained by the parole of *all* prisoners of war as soon after capture as practicable, on condition that they do not bear arms until exchanged.

6th. It is recommended that the Secretaries of the Sections communicate the conclusions agreed upon to the United States and foreign governments.

"ARTICLE I.—Les ambulances et les hôpitaux militaires seront reconnus neutres, et, comme tels, protégés et respectés par les belligérants aussi longtemps qu'il s'y trouvera des malades ou des blessés.

"La neutralité cesserait si ces ambulances ou ces hôpitaux étaient gardés par une force militaire.

"ARTICLE II.— Le personnel des hôpitaux et des ambulances, comprenant l'intendance, les services de santé, l'administration de transport des blessés, ainsi que les aumôniers, participera au bénéfice de la neutralité lorsqu'il fonctionnera, et tant qu'il restera des blessés à relever ou à secourir.

"ARTICLE III.—Les personnes désignées dans l'Article précédent pourront, même après l'occupation par l'ennemi, continuer à remplir leurs fonctions dans l'hôpital ou

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1 *Correspondenzblatt für Schweiz. Aerzte*, 1875, v, p. 498.

2 See Stevenson, *op. cit.*, p. 172; Maj. Gen. Heth, C. S. A., says: "If the soldiers last winter under my command had been in prison, and had been restricted to the rations allowed them, these would have been found miserably insufficient. Some days they had no meat. I myself have repeatedly gone to my horse's feed trough, and robbed him of corn, which I have parched to appease my hunger. Had my men been in confinement, their sufferings would have been intense. But they were in open air; they were free; they were constantly skirmishing; they had opportunities for amusing themselves; and they had other things to think about besides their own personal discomforts. Had it been otherwise, the troops of my division would have been decimated by disease."

l'ambulance qu'elles desservent, ou se retirer pour rejoindre le corps auquel elles appartiennent.

"Dans ces circonstances, lorsque ces personnes cesseront leurs fonctions, elles seront remises aux avant-postes ennemis, par les soins de l'armée occupant.

"ARTICLE IV.—Le matériel des hôpitaux militaires demeurant soumis aux lois de la guerre, les personnes attachées à ces hôpitaux ne pourront, en se retirant, emporter que les objets qui sont leur propriété particulière.

"Dans les mêmes circonstances, au contraire, l'ambulance conservera son matériel.

"ARTICLE V.—Les habitants du pays qui porteront secours aux blessés, seront respectés, et demeureront libres. Les Généraux des Puissances belligérantes auront pour mission de prévenir les habitants de l'appel fait à leur humanité, et de la neutralité qui en sera la conséquence.

"Tout blessé recueilli et soigné dans une maison y servira de sauvegarde. L'habitant qui aura recueilli chez lui des blessés sera dispensé du logement des troupes, ainsi que d'une partie des contributions de guerre qui seraient imposées.

"ARTICLE VI.—Les militaires blessés ou malades seront recueillis et soignés, à quelque nation qu'ils appartiendront.

"Les Commandants en chef auront la faculté de remettre immédiatement aux avant-postes ennemis, les militaires blessés pendant le combat, lorsque les circonstances le permettront, et du consentement des deux partis.

"Seront renvoyés dans leurs pays ceux qui, après guérison seront reconnus incapables de servir.

"Les autres pourront être également renvoyés, à la condition de ne pas reprendre les armes pendant la durée de la guerre.

"Les évacuations, avec le personnel qui les dirige, seront couvertes par une neutralité absolue.

"ARTICLE VII.—Un drapeau distinctif et uniforme sera adopté pour les hôpitaux, les ambulances et les évacuations. Il devra être, en toute circonstance, accompagné du drapeau national.

"Un brassard sera également admis pour le personnel neutralisé, mais la délivrance en sera laissée à l'autorité militaire.

"Le drapeau et le brassard porteront croix rouge sur fond blanc.

"ARTICLE VIII.—Les détails d'exécution de la présente Convention seront réglés par les Commandants-en-chef des armées belligérantes, d'après les instructions de leurs Gouvernements respectifs, et conformément aux principes généraux énoncés dans cette Convention.

"ARTICLE IX.—Les Hautes Puissances Contractantes sont convenues de communiquer la présente Convention aux Gouvernements qui n'ont pu envoyer des Plénipotentiaires à la Conférence Internationale de Genève, en les invitant à y accéder; le Protocole est à cet effet laissé ouvert.

"ARTICLE X.—La présente Convention sera ratifiée, et les ratifications en seront échangées à Berne, dans l'espace de quatre mois, ou plus tôt si faire se peut.

"En foi de quoi les Plénipotentiaires respectifs l'ont signée, et y ont apposé le cachet de leurs armes.

"Fait à Genève, le vingt-deuxième jour du mois d'Août, de l'an mil huit cent soixante-quatre."

"Articles additionnels du 20 octobre, 1868." Not yet adopted by the signatory governments. But in 1870 the belligerent powers accepted them.

"ARTICLE 1.—Le personnel désigné dans l'article 2 de la convention continuera, après l'occupation par l'ennemi, à donner, dans la mesure des besoins, ses soins aux malades et aux blessés de l'ambulance ou de l'hôpital qu'il dessert. Lorsqu'il demandera à se

retirer, le commandant des troupes occupantes fixera le moment de ce départ, qu'il ne pourra toutefois différer que pour une courte durée, en cas de nécessités militaires.

"2.—Des dispositions devront être prises par les puissances belligérantes, pour assurer au personnel neutralisé, tombé entre les mains de l'armée ennemie, la jouissance intégrale de son traitement. p. 96.

"3.—Dans les conditions prévues dans les articles 1 et 4 de la Convention, la dénomination *d'ambulance* s'applique aux hôpitaux de campagne et autres établissements temporaires, qui suivent les troupes sur les champs de bataille, pour y recevoir des malades et des blessés.

"4.—Conformément à l'esprit de l'article 5 de la Convention et aux réserves mentionnées au protocole de 1864, il est expliqué que, pour la répartition des charges relatives au logement des troupes et aux conditions de guerre, il ne sera tenu compte que dans la mesure de l'équité, du zèle charitable déployé par les habitants.

"5.—Par extension de l'article 6 de la Convention, il est stipulé que, sous la réserve des officiers, dont la possession importerait au sort des armes, et dans les limites fixées par le deuxième paragraphe de cet article, les blessés tombés entre les mains de l'ennemi, lors même qu'ils ne seraient pas reconnus incapables de servir, devront être renvoyés dans leurs pays après leur guérison, ou plus tôt si faire se peut, à la condition toutefois de ne pas reprendre les armes pendant la durée de la guerre."

From "Règlement sur le service de santé de l'armée," Paris, 1884, p. 96.

"At the Brussels session of the Institute, in 1879, a commission of fifteen members was appointed to prepare a code, or manual, of the rules of war on land. The task of collecting the materials, and preparing the proposed code, was intrusted to M. Gustave Moynier, of Geneva, Switzerland, the President of the International Society for the Relief of the Wounded in Time of War. The selection of M. Moynier for this purpose was a most fortunate one in every respect, and he addressed himself to his task with so much zeal and intelligence that, in February of the following year, he was able to submit to his colleagues a draft of the proposed manual. The rules prepared by M. Moynier were based upon the following authorities :—

(*a*) The Instructions for the Government of Armies in the Field, prepared by Dr. Francis Lieber, at the request of the United States Government.

(*b*) The Geneva Convention of August 22d, 1864.

(*c*) The Additional Articles of the Geneva Convention of October 20th, 1868.

(*d*) The Declaration of St. Petersburg of November 4th–16th, 1868.

(*e*) The Declaration of Brussels of 1874.

(*f*) The Official Manuals recently adopted by the governments of France, Russia and Holland.

"The code, thus prepared, was submitted to the members of the Commission for examination and criticism. As a result the rules were entirely rewritten. A number of modifications and amendments, suggested by the members, were embodied in the work, which was again submitted to the Commission for discussion and final action. It was approved by that body, and recommended for acceptance. On September 9th, 1880, it was unanimously adopted by the Institute of International Law. By a later resolution of the Institute, the Executive was instructed to bring the proposed rules to the notice of the different governments of Europe and America, with a view to their adoption, as a standard, to which their laws and regulations on the subject should be made to conform."

| Union Military Prisons. | Admitted. | Died. | Per cent. | Period. |
|---|---|---|---|---|
| Alton, Ills | 9,330 | 1,613 | .17 | Feb. 9th, '62 to July, '65. |
| Camp Butler, Ills | 4,970 | 816 | .16 | Feb. 1st, '62 to July, '65. |
| Camp Chase, Ohio | 16,335 | 2,108 | .13 | '62 to Aug. 23d '65. |
| Camp Douglass, Ohio | 26,060 | 3,759 | .14 | '62 to Sep., '65. |
| Camp Morton, Ind | 12,082 | 1,763 | .15 | '63 to Nov., '65. |
| Elmira, N. Y | 12,147 | 2,980 | .24 | *July, '64 to Aug., '65. |
| Ft. Delaware, Del | 25,275 | 2,502 | .10 | Feb., '61 to Jan., '66. |
| Ft. McHenry, Md | 5,358 | 33 | .006 | Feb. 26th, '61 to Dec., '65. |
| Johnson's Island, Ills | 7,627 | 270 | .036 | Jan. 1st, '62 to Nov. 23d, '65. |
| Louisville, Ky | 8,517 | 139 | .016 | Unknown. |
| Ft. Lafayette, N. Y | 409 | 2 | .005 | During war. |
| Hart's Island, New York harbor | 3,347 | 230 | .07 | April to July, '65. |
| Newport News, Va | 3,475 | 89 | .003 | April to July, '65. |
| New Orleans, La | 5,788 | 329 | .06 | Nov., '63 to end of war. |
| Old Capitol Prison, Washington | 6,218 | 457 | .07 | Oct., '62 to end of war. |
| Point Lookout, Md | 41,499 | 3,446 | .08 | July, '63 to end of war. |
| Rock Island, Ills | 11,458 | 1,922 | .17 | Dec., '63 to end of war. |
| St. Louis, Mo | 5,174 | 589 | .11 | July, '62 to end of war. |
| Ship Island, Miss | 5,041 | 162 | .03 | July 1st, '62 to July, '65. |
| Ft. Warren, Boston harbor | 2,320 | 13 | .006 | Oct. 29th, '61 to July, '65. |
| Total | 212,490 | 23,222 | .11 | |

* Report 45, *op. cit.*, states October to August.

| Confederate Military Prisons. | No. of Union graves. | Confederate Military Prisons. | No. of Union graves. |
|---|---|---|---|
| Andersonville | 13,705 | Danville, Va | 1,323 |
| Belle Isle, near Richmond | .. | Florence, S. C | 2,795 |
| Cahawba, Ala | 147 | Macon, Ga | 236 |
| Camp Lawton, Burk Co., Ga | .. | Richmond, Va | 3,450 |
| Castle Thunder, near Richmond, Va | .. | Salisbury, N. C | 12,112 |
| Charleston, S. C | 389 | Tuscaloosa, Ala | .. |
| Columbia, S. C | 33 | | 34,190 |

MORBIDITY AND MORTALITY OF THE GERMAN ARMY AND FRENCH PRISONERS.

| | German army *mobile*.* | | | German army *immobile*.† | | | French prisoners.‡ | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cases. | Deaths. | Per c. | Cases. | Deaths. | Per c. | Cases. | Deaths. | Per c. |
| Sick | 480,035 | 14,904 | 3.1 | .. | .. | .. | 163,133 | 14,633 | 6 |
| Wounded | 116,821 | 28,278 | 24.2 | .. | .. | .. | 35,898 | 3,000 | 8.3 |
| Total | 596,856 | 43,182 | 7.2 | 177,599 | 2,428 | 1.4 | 199,031 | 17,633 | 8.8 |

* Table 171, p. 412.* Between Aug. 1st, 1870, and Jan. 31st, 1871, there were 352,011 sick and 116,164 wounded; total, 468,175.

† Table 192, p. 432.* Deaths from smallpox 162, typhus 766, dysentery 107.

‡ Table 212, p. 472.* Deaths from typhoid 4529, dysentery 1870, pneumonia 1392, consumption 1088.

# DIE CONSERVATIVE CHIRURGIE IM DIENSTE DER MODERNEN WAFFEN.

## CONSERVATIVE SURGERY IN MODERN WARFARE.

## CHIRURGIE CONSERVATRICE DANS LES GUERRES MODERNES.

(EIN ERÖFFNUNGS-VORTRAG.)

VON DR. NEUDÖRFER

Wien.

MEINE HERREN! — Mir ist die ehrenvolle Aufgabe zu Theil geworden, den Einführungs-Vortrag für den heutigen Tag zu halten. Mit diesem Vortrage habe ich die Verpflichtung übernommen, der Dolmetscher der geehrten Sektion zu sein, gewisse von den Mitgliedern der Sektion empfundene, nicht gelöste militär-chirurgische Fragen klar zu formuliren, sie von verschiedenen Gesichtspunkten zu beleuchten, sie Ihnen zur Discussion zurecht zu legen und durch diese der Entscheidung zuzuführen.

Ich glaube mich der Zustimmung Aller versichert zu halten, wenn ich Ihnen vorschlage, zum ersten Gegenstand der Discussion in der geehrten Sektion die wichtige Frage "Ueber die Stellung der conservativen Chirurgie in der modernen Kriegführung" zu bestimmen.

Ich möchte damit beginnen, den Begriff der conservativen Chirurgie scharf zu bestimmen. Die Militär-Chirurgen aller Zeit glaubten, conservative Chirurgie geübt und durch die Amputation der Glieder das Leben ihrer Verwundeten conservirt zu haben. Andere Chirurgen glaubten, mit der blossen Erhaltung der Glieder allen Anforderungen der conservativen Chirurgie entsprochen zu haben. Wieder Andere waren in der Wahl der Mittel und Methoden zur Erreichung dieses Zieles nicht besonders wählerisch.

Es wird daher zweckmässig sein, anzugeben: Wir verstehen unter *conservative* Chirurgie, *dem Verwundeten sein Leben und seine Glieder zu erhalten, mit der geringsten Beeinträchtigung ihrer Funktion, mit der kleinsten Verkümmerung des Lebensgenusses des Verwundeten, und dieses Resultat in der möglichst kürzesten Zeit und mit den einfachsten, wenig eingreifenden Mitteln und Methoden zu erreichen.*

Die Erreichung dieses hohen Zieles hängt von sehr verschiedenen Bedingungen ab, die wir uns zur übersichtlichen Besprechung in drei Gruppen eintheilen wollen. — Die erste Gruppe umfasst den Einfluss des Fortschrittes in der Waffentechnik auf die Zahl und Schwere der Verletzungen; die erste Hilfe im Felde und die Transportbehelfe zur Fortschaffung der Verwundeten; ferner die Indikationen zu einem operativen Eingreifen überhaupt, speciell die Indikationen für die Amputation und für die Resektionen im Felde; endlich den Rath, wie sich der Militärchirurg bei Bauch- und Brustschüssen, bei Schussfrakturen der grossen und langen Knochen u. s. w. im Felde zu verhalten hat. — Die zweite Gruppe behandelt die verschiedenen Methoden der Wundbehandlung und deren Verwendbarkeit im Kriege. — Die dritte Gruppe endlich behandelt die Unterbringung der Verwundeten und Kranken in den verschiedenen Kriegshospitälern. Die Gefahren dieser Spitäler, und wie dieselben nach unseren gegenwärtigen Ansichten über Aetiologie und Hygiëne einzurichten sind. — Die Reichhaltigkeit der Fragen zwingt uns, für heute die Besprechung auf die Fragen der ersten Gruppe einzuschränken, und jene der zweiten und dritten Gruppe späteren Verhandlungstagen zuzuweisen.

Wir wollen zunächst die Frage der Discussion unterwerfen: Ist die allgemeine Annahme begründet, dass der Fortschritt der Waffentechnik und der neuen Kriegsführung

die Zahl der Verletzungen und die Schwere der letzteren vergrössert und die Aussichten der conservativen Chirurgie einengt?

Seit fünfzig Jahren sehen wir in allen Staaten folgende Wandlungen in der Waffentechnik: Das glatte Gewehr muss dem gezogenen, dieses muss als Vorderlader dem Hinterlader weichen; das letztere muss als Einzellader dem Magazinlader oder Repetirgewehre Platz machen, mit welchem man bis zu zwanzig Schüsse in der Minute abfeuern kann. Bedenkt man ferner, dass die heutigen Armeen sich gegen die früheren allenthalben mindestens verdreifacht haben, so muss man zugeben, dass die absolute Zahl der Verwundeten in den modernen Kriegen wachsen muss. Ob auch die relative Zahl der Verwundeten, d. h. das Verhältniss der Zahl der Verwundeten zu jener der Kämpfenden in den modernen Kriegen zunehmen wird, darüber lässt sich zur Stunde kein bestimmtes Urtheil fällen. Aus den Ergebnissen früherer Kriege hat man berechnet, dass auf einen Verwundeten, d. i. auf einen Treffer so viel Fehlschüsse kommen, dass das Gewicht des verschossenen Bleies dem Gewicht des Verwundeten gleichkommt. Die neueren Waffen als Präcisionswaffen lassen im Allgemeinen zwar eine grössere Trefffähigkeit erwarten, aber bei der grösseren Tragweite derselben wird die Annäherung der feindlichen Kräfte aneinander sehr erschwert werden. Ein grosser Theil der Schlachten wird in der Entfernung von 1200 bis 2000 Metern gekämpft werden, wodurch die relative Zahl der Verwundungen, ungeachtet der grösseren Leistungsfähigkeit der neueren Waffen möglicherweise dieselbe bleiben dürfte, wie in den früheren Kriegen.

Dagegen lässt sich der Beweis erbringen, dass mit dem Fortschritt der Waffentechnik und mit der Umwandlung des früheren Feuergewehres in eine Präcisionswaffe, die Schwere der Verletzungen abnehmen muss. Es wurde schon erwähnt, dass die neueren Waffen eine grössere Tragweite haben, eine Annäherung der Kämpfenden erschweren und den Bajonettangriff unmöglich machen. Bei dem Kampfe in der Entfernung von 1200 bis 2000 Metern werden die Projektile erst in dem letzten und untersten Theile ihrer Fluglinie den Feind treffen, es werden daher die tödtlichen Schädel- und die schweren und gefährlichen Brust- und Bauchschüsse relativ selten sein, die Mehrzahl der Verletzungen wird die unteren Extremitäten treffen. Es wird also die absolute und relative Zahl der Tödtungen durch die neueren Waffen abnehmen.

Aber es lässt sich zeigen, dass auch die Schwere der Verwundungen im Allgemeinen bei den modernen Waffen abnehmen muss.

Die tägliche Erfahrung lehrt und die Theorie erklärt, dass mit der Abnahme des Kalibers auch die Schwere der Schussverletzung abnimmt; bei den modernen Waffen ist das Projektil (Kaliber) bereits kleiner geworden und wird noch kleiner werden, sobald es gelingen wird, die Bereitung des Pulvers zu verbessern. Rubin ist mit dem Kaliber bis 7.5 mm. hinabgegangen, ein Kaliber, das sich dem Revolver-Kaliber nähert. Aber auch noch in einer anderen Richtung erweisen sich die Verwundungen mit unseren modernen Waffen als schonender wie jene mit den alten Waffen erzeugten. Die Arbeit, die das Projektil beim Durchschlagen des Körpers leistet, wird durch die Formel $p = \frac{m\,v^2}{2}$ ausgedrückt, wobei "m" die Masse des Projektils und "v" seine Geschwindigkeit bedeutet. Aus dieser Formel ist zu entnehmen, dass wenn auch das Kaliber und die Masse des Projektils kleiner werden, wenn nur die Geschwindigkeit grösser ist, so wird die Durchschlagkraft des Projektils wachsen. Die getroffenen Theilchen werden sehr rasch vom Knochen getrennt, d. h. von der Umgebung abgelöst, so dass keine Zeit ist, den Knochen zu biegen und zu brechen. Schüsse in den Knochen werden selten Schussfrakturen, sondern Lochschüsse im Knochen zurücklassen. Bei der grossen Geschwindigkeit der modernen Projektile fehlt überhaupt die Fortpflanzung des Stosses und der Erschütterung auf die Umgebung des Knochens. Die Lebensfähigkeit des Knochens wird durch das Projektil wenig gefährdet, der Shock ist kleiner und die Aussicht auf Erhaltung des getroffenen Theiles wird grösser.

Es ist hier noch ein anderer Fortschritt der modernen Waffentechnik ins Auge zu fassen. Die Bleiprojektile haben den grossen Nachtheil, beim Auf- und Durchschlagen des Knochens stark deformirt zu werden. Das weiche Blei findet an dem harten Knochen einen starken Widerstand, verändert seine Form, verkleinert seine Geschwindigkeit, vergrössert die Wunde, die Erschütterung des Knochens und den Shock, wodurch eine Aggravation der Wunde herbeigeführt wird.

Man hat daher schon lange gesucht, diesem Uebelstand dadurch abzuhelfen, dass man anstatt des reinen weichen Bleies das Hartblei, eine Legirung von Blei mit Zinn oder mit Antimon zu Projektilen verwendet; doch war mit diesem Mittel das Uebel der Deformation der Projektile nur kleiner, nicht beseitigt worden. Die Verwendung von Stahlprojektilen könnte zwar dem Uebelstand abhelfen, doch würde das kleinere specifische Gewicht des Stahles (7.8) den ballistischen Effekt beeinträchtigen. — Vor einigen Jahren ist es H. Lorenz in Karlsruhe gelungen, durch die Erfindung seiner verschmolzenen Panzergeschosse (Bleiprojektile mit verschmolzenem Stahlmantel) den ballistischen Effekt der Projektile zu steigern und dieselben fast undeformirbar zu machen. Die unveränderlichen Lorenz'schen Panzergeschosse sind daher geeignet, der conservativen Chirurgie Vorschub zu leisten.

Ich muss hier noch über die explosive Wirkung der modernen Projektile einige Worte hinzufügen. Es ist bekannt, dass alle Projektile, die eine 333 m. überschreitende Anfangs-Geschwindigkeit haben, beim Einschlagen in den menschlichen Körper in einer Entfernung von 60 bis 90 m. in demselben eine Höhle erzeugen, als ob das Projektil an der getroffenen Stelle des Körpers explodirt wäre, und dass die sogenannte Explosiv-Zone mit dem Wachsen der Anfangs-Geschwindigkeit zunimmt. Es könnte daher scheinen, dass die mit den modernen Waffen erzeugten Wunden sehr bedeutende Zerstörungen zeigen und schwere sein werden, doch ist dem nicht ganz so. — Ich habe gezeigt, dass die Explosionswirkung der Projektile von der vor dem Projektile gestauten Luftsäule herrührt. Diese Luftstauung vor dem Projektile ist nur so lange möglich, als das Projektil sich in der Richtung der Tangente seiner Flugbahn bewegt; sobald es von dieser Richtung abweicht, hört auch die Stauung und explosive Wirkung derselben auf. Mit dem Wachsen der Anfangsgeschwindigkeit nimmt auch der Luftwiderstand zu und zwingt das Projektil, von seiner tangentialen Richtung abzulenken. Es wird demnach die sogenannte Explosionszone auch bei den verbesserten Waffen nicht erheblich vergrössert, da aber die Schlachten mit den modernen Waffen in grösserer Entfernung der Kämpfenden von einander durchgekämpft werden, so kommt der geringe Zuwachs der explosiven Zone kaum in Betracht.

Ich habe noch über den Einfluss des groben Geschützes auf die conservative Chirurgie Folgendes hinzuzufügen: Wunden durch grobe Geschosse werden dem Chirurgen überhaupt nicht häufig unter die Hände kommen. Die von Kanonenprojektilen Getroffenen bleiben sofort todt, sind daher kein Gegenstand chirurgischer Behandlung; gegen die Wirkung von Sprengstücken schützen sich die Menschen zum Theil durch das Zubodenwerfen.

Das grobe Geschütz hat überhaupt nicht den Zweck, Menschen zu verwunden, sondern eine Position zu räumen, eine Strasse oder Brücke unpassirbar zu machen und die letztere zu zerstören. Die Wirkung des groben Geschützes ist überhaupt mehr eine moralische. Auf die conservative Chirurgie haben die Fortschritte dieser Waffe überhaupt keinen Einfluss.

Aus dem Gesagten geht hervor, dass mit der Abnahme des Kalibers der Handfeuerwaffen, mit der grösseren Fluggeschwindigkeit und Tragweite, mit der Unveränderlichkeit der Form der Projektile, die Schwere der Wunden abnimmt. Die Wunden in den Weichtheilen, wie im Knochen werden reine Lochschüsse, wie mit dem Locheisen hervorgebracht sein; das Wichtigste ist, dass die Zahl der Schussfrakturen, die Wund-

complicationen und die Heilungsdauer der Schusswunden abnehmen, die Chancen der conservativen Chirurgie zunehmen werden.

Mit der Abnahme der Schussfrakturen und der Schwere der Wunden überhaupt vereinfacht und erleichtert sich die Aufgabe der ersten Hilfe im Felde. Wenn auch die Zahl der aus dem Gefechte zu Tragenden nicht kleiner werden dürfte, weil auch solche Verwundete, die gehen könnten, durch den Gedanken, tödtlich getroffen zu sein, ohnmächtig zusammensinken und getragen werden müssen, so ist doch die erste Hilfeleistung, mit wenigen gleich zu nennenden Ausnahmen, sehr leicht, sehr einfach und auch ohne besondere Schulung, ohne Nachtheil für den Verwundeten ausführbar.

Meiner Ansicht nach soll sich die erste Hilfe im Kriege nur auf das ungesäumte Fortschaffen des Verwundeten aus der Feuerlinie beschränken. Die Gefahr und der Nachtheil, ein zweites und drittes Mal verwundet zu werden, ist für den Verwundeten viel grösser als der problematische Nutzen und Vortheil des ersten Wundverbandes.

Die Nothwendigkeit einer Blutstillung ist im Felde wenig wahrscheinlich, dort wo sie in seltenen Fällen lebensrettend wirken könnte, käme die beste erste Hilfe zu spät. Prophilaktische Blutstillung aber ist nicht nothwendig und direkt schädlich. Ich halte dafür, dass der Verwundete auf der Strecke bis zum Verbandplatze keinen Wundverband nöthig hat. Die Wunde kann offen bleiben und braucht nur gegen Regen, Staub und Schmutz lose bedeckt zu werden. Der Helfer und Träger soll die Wunde nicht berühren, weil eine solche Berührung eher schadet als nützt. Nur bei Schussfrakturen der untern Extremität wird das gebrochene Bein in eine Blech- oder Draht-Hohlschiene gelagert und daselbst fixirt. Auch hier sollte die Wunde selbst von der Hand des Helfers unberührt bleiben.

Die Methode einer einfachen und schnellen Fixation und Extension der Fragmente für alle Röhrenknochen wäre ein würdiges Objekt für die Berathung durch die geehrte Sektion; eventuell wäre ein solcher Frakturverband für die erste Hilfe zum Gegenstand einer Preisaufgabe zu machen, da die bisherige Methode dieser Frakturverbände den Anforderungen nicht ganz entspricht.

Als Nachtheil muss es angeführt werden, dass die Zahl der systemisirten Tragbahren (in allen Staaten) für die Zahl der Verwundeten nicht ausreicht, diese daher nicht rasch genug fortgeschafft werden können. Die Tragbahre selbst ist sehr der Verbesserung bedürftig, sie sollte keine grubige Vertiefung in der Gegend haben, wo das Becken des Verwundeten liegt; sie sollte seitliche Leisten haben und geräumiger und bequemer für den Verwundeten sein. Die Tragbahre soll auf ein Rädergestell gelegt, durch einen Mann wegzubringen sein, zum Auf- und Abladen können immerhin drei Mann mitwirken. Die Zahl der Helfer könnte dann kleiner sein.

Es sollte ferner der Hilfsplatz und jede andere, welchen Namen immer tragende Zwischenstation zwischen dem Schlachtfelde und dem Verbandplatze als zwecklos und nachtheilig beseitigt werden. Die Verwundeten sollen direkt auf den Verbandplatz gebracht werden, dort die später zu besprechende *ärztliche* Hilfe finden und von dort in die Feld-, Reserve- und stabile Hospitäler gebracht werden. Es müsste dann ein Verbandplatz auf jede Brigade oder für eine halbe Brigade errichtet werden.

Es würde sich empfehlen, dem Verwundeten ein Mittel anzudeuten, in welcher Weise er sich den Helfern bemerkbar machen könne. Es ist vorgekommen, dass Verwundete Stunden lang auf dem Schlachtfelde liegen geblieben sind. Ein von dem Verwundeten zu gebendes Nothsignal könnte dem Uebelstande abhelfen.

Die erste Hilfe im Kriege müsste eine neue Organisation erfahren.

Es unterliegt keinem Zweifel, dass es im Interesse des Verwundeten gelegen ist, die Verwundeten möglichst bald und möglichst schnell in die weit hinter dem Kriegsschauplatz errichteten Kriegsspitäler zu transportiren. Es erscheint daher nothwendig, den Begriff "Intransportabel" zu präcisiren. Es wird diese Bezeichnung nicht auf Grund-

lage bestimmter Symptome oder Indicationen einem Verwundeten beigelegt und sehr häufig auf Verwundete angewendet, die transportirt werden könnten und sollten. Es wird daher Ihre Aufgabe sein, die Contraindicationen aufzustellen, die sich dem Transport eines Verwundeten entgegenstellen.

Indem ich nun zu der operativen Thätigkeit auf dem Verbandplatze übergehe, will ich mit der Amputationsfrage beginnen und in kurzen Umrissen zeigen, welche Wandlungen diese Frage durchgemacht hat. Im vorigen Jahrhundert wurde die Amputation als nöthiges Heilmittel für jede schwere Schussverletzung betrachtet; dabei wurde die Früh-oder primäre Amputation befürwortet, weil diese ein viel günstigeres Heilresultat als die sekundäre und die Spät-Amputation gibt, die Amputation als solche nicht umgangen werden kann. Diese Ansicht hat sich bis in unser Jahrhundert erhalten und wurde erst aufgegeben, als man erkannt hat, dass schwere Schussverletzungen ohne Amputation ausheilen können. Man hat dann die Indicationen für die Amputation auf die Schussfrakturen und solche Weichtheilschüsse eingeschränkt, bei denen die grossen Gefässe und Nerven zerrissen worden sind. Zahlreiche Beobachtungen von Heilung schwerer Schussfrakturen und Gefäss- oder Nerven-Zerreissung haben auch die Gültigkeit dieser eingeschränkten Indicationen erschüttert.

Man hat dann in den besonderen Kriegsverhältnissen die Nothwendigkeit der Amputation gesehen. Man behauptete, ein mit einer Schussfraktur Verwundeter könne nicht liegen gelassen und nicht transportirt, müsse daher amputirt werden, weil die profuse Eiterung, sowie der Transport für den Verwundeten gleich gefährlich sind. Gegenwärtig haben wir als Indication für die Amputation einer Extremität nur jene Fälle von Verwundungen oder Erkrankungen anzusehen, bei welchen die Extremität absolut nicht erhalten und geheilt werden kann, und bei denen die bestehende Verletzung oder Erkrankung das Leben des Verletzten oder Kranken gefährdet. Es unterliegt keinem Zweifel, dass eine durch ein grobes Geschoss verletzte Extremität nicht geheilt und daher nicht erhalten werden kann, dass daher gegen die Amputation eines solchen Gliedes nichts einzuwenden sein wird, wenn auch die Aussicht auf die Erhaltung des Lebens eines durch ein Kanonenprojektil Verletzten nur sehr gering ist. Dagegen erscheint die Behauptung, die mit einer Hand-Feuerwaffe erzeugte Schussfraktur sei unheilbar und bedrohe das Leben, absolut ungerechtfertigt. Wir können den Satz umkehren und behaupten, das Schussfrakturen nur ausnahmsweise nicht heilen, besonders wenn das Kaliber der verletzenden Waffe klein ist. Es ist fast durchgehends möglich, die profuse Eiterung zu verhüten, auch ist der Transport mit Hilfe des Gypsschienen-Verbandes ohne Schmerz und ohne Gefahr für den Verletzten möglich. Es wird zwar Fälle geben, die bei aller Pflege und rationeller Behandlung nicht zur Heilung gelangen, durch lange Eiterung das Leben bedrohen und die Absetzung der verletzten Extremität unerlässlich machen werden; doch wird diese Nothwendigkeit als *ultima ratio* erst nach Wochen oder Monaten nothwendig werden. Es ergibt sich aus dem Gesagten, *dass auf dem Verbandplatze die Nothwendigkeit, zu amputiren, gar nicht vorhanden oder nur auf vereinzelte Ausnahmen eingeschränkt ist.*

Auf die Frage der Resektion übergehend, so unterliegt es keinem Zweifel, dass eine Resektion der Continuität oder der Contiguität der Knochen niemals primär als *indicatio vitalis* anzusehen ist. Allen erfahrenen Chirurgen ist eine grosse Zahl von Schussfrakturen und Schussverletzungen der Gelenke bekannt, bei denen ohne jeden chirurgischen Eingriff Heilung und Consolidation der gesplitterten Knochen und der verletzten Gelenke, bei den letztern sogar mit voller Beweglichkeit des Gelenkapparates, eingetreten ist. Die Naturheilung ist daher auch im Felde unter allen Umständen anzustreben; wenn diese misslingt, also erst nach Wochen, ist die Arthrotomie, Arthrectomie und erst in letzter Linie die Gelenkresektion (die Continuitätsresektion in der Continuität der Knochen), in Betracht zu ziehen. Es geht daraus hervor, dass auch die Resektion keine eigentliche Feldoperation ist. Die Resektion kann selbst dort, wo sie

indicirt ist, ohne Schaden, ja oft mit Vortheil, verschoben werden, bis der Verwundete in ein stabiles Hospital gebracht worden ist.

Ich komme nun zu der im Kopfe der Laien spukenden Nothwendigkeit der Gefässunterbindungen im Felde.

Es wird wohl kaum einen Chirurgen geben, der zögern würde, ein grösseres spritzendes Gefäss oder eine stark blutende grössere Vene zu unterbinden oder auf eine andere Weise zu verschliessen; es wird jedoch eine solche Eventualität fast nie auf dem Verbandplatze vorkommen. Die im Felde vorkommenden Blutungen sind fast durchgehends tödtlich oder stehen von selbst still. Die spontane Blutstillung bei Schusswunden erfolgt zum Theil durch Machure der Arterien durch das Projektil, zum Theil aber durch die vasomotorische Contraction der Arterien. Es ist auch bisher noch niemals bei Schussverletzungen direkt wegen einer Blutung eine Gefässunterbindung ausgeführt worden. Die wenigen im Felde ausgeführten Unterbindungen waren prophilaktische Unterbindungen, die wegen der Möglichkeit einer Blutung ausgeführt worden sind.

Nun sind prophilaktische Unterbindungen auf dem Schlachtfelde überhaupt nicht angezeigt, und prophilaktische Unterbindungen sind direkt contra-indicirt, weil wir in der Tamponade, im Wasserstoff-Superoxyd, besonders aber in der elastischen Einwicklung ein einfacheres, sicheres und minder schädliches prophilaktisches Hämostaticum haben. Auf dem Verbandplatze sind daher weder Amputationen, noch Resektionen, noch Gefässunterbindungen auszuführen. Es ist jedoch damit nicht gesagt, dass auch jede andere operative Thätigkeit auf dem Verbandplatze ausgeschlossen ist.

Ich möchte hier zuerst anführen: Der Verwundete, der mir 1859 in der Schlacht von Solferino überbracht worden ist, war ein Hauptmann, dem ein französisches Projektil die Bauchhöhle eröffnet, ein Dünndarmschlingen-Convolut aus der Schussöffnung hervorgedrängt und eingeschnürt hatte. In dem vorgelagerten Convolut war der Darm doppelt durchschossen. Damals habe ich keinen Versuch gemacht, chirurgisch zu interveniren. Ich habe dem Verwundeten eine subkutane Morphium-Injection applizirt, habe ihm seine letzten Wünsche abnehmen, dann bei Seite legen und ruhig sterben lassen. Heute würde ich in einem solchen Falle anders handeln. Ich würde die durchbohrten Schlingen reseziren, die Darmstümpfe durch die Nath vereinigen und die vereinigten Stümpfe reponiren. Ich würde keinen Augenblick zögern, behufs Reinigung der Bauchhöhle von Blut und ausgetretenem Kothe die Laparotomie und die Bauchnath auszuführen. So gering die Chancen für den günstigen Ausgang einer solchen Operation im Felde auch sein mögen, so gewährt dieselbe doch die einzige Möglichkeit, einen Verletzten mit einem durchschossenen Darm am Leben zu erhalten. Ihre Discussion soll die Darm-Resektion und die Laparotomie auf dem Verbandplatze sanktioniren oder proskribiren. Es handelt sich dabei um die Entscheidung, ob es gestattet ist, einem Verwundeten zur Ausführung einer Operation, deren Erfolg zweifelhaft ist, ein bis zwei Stunden kostbarer Zeit und viele ärztliche Hände zu widmen, wo es so viele andere Verwundete gibt, die ein gleiches Anrecht auf die Zeit und die Hände der Aerzte haben.

Bei Schussverletzungen der Brust mit und ohne Verletzungen der Rippen wird es sich darum handeln, ob wir es mit einem Hämo-Pneumo-Thorax zu thun haben. Im negativen Falle ist selbstverständlich nur exspectativ vorzugehen und die Brustwunde mit einem Wunddeckverbande zu versehen; dagegen fragt es sich, ob es angezeigt ist, bei einem Brustschusse mit Splitterung der Rippen und Eröffnung der Brustfellhöhle schon auf dem Verbandplatze die sichtbaren losen Rippensplitter zu extrahiren und die Behandlung des Hämo-Pneumo-Thorax nach der Methode von Curschmann in Hamburg einzuleiten. Ihre Discussion wird die Vor- und Nachtheile der Methode klären und die Frage zur Entscheidung bringen.

Bei Schussverletzungen des Halses, speciell des Kehlkopfes, ist, wenn Athembe-

schwerden vorhanden sind, die Laryngo-Tracheotomie sowohl als *indicatio vitalis*, wie auch als prophilaktische Operation auf dem Verbandplatze unerlässlich.

Bei Schädelverletzungen mit Bruch und Depression ist die Extraktion von Projektilen oder fremden Körpern, wenn dieselben ohne besonders eingreifende Operationen ausführbar sind, schon auf dem Verdandplatze geboten; dagegen soll es durch Ihre Discussion entschieden werden, ob und was auf dem Verbandplatze bei einer Schädelverletzung mit schweren Hirnerscheinungen zu unternehmen ist.

Ich habe jetzt nur noch einige Worte über die chirurgische Thätigkeit der Aerzte auf dem Verbandplatze hinzuzufügen.

Die Extraktion von Projektilen und von fremden Körpern aus einer Schusswunde, wenn dieselben nicht erst gesucht oder durch eine vorauszuschickende Operation eingeleitet werden müssen, gehört zur Hilfeleistung auf dem Verbandplatze. Die wichtigste Aufgabe bleibt aber bei allen Wundöffnungen, einen den lokalen Verhältnissen der Wunde entsprechenden, nicht reizenden und leicht abnehmbaren Wunddeckverband als Dauerverband anzulegen. Bei Schussfrakturen der langen Röhrenknochen und der Gelenke ist überdies ein fixirender Verband anzulegen. Ich halte die verschiedenen geformten Schienen von Merchie, von Guillery, von Ahl, sowie die verschiedenen Holz-, Zink- und Drahtschienen für diesen Zweck weniger geeignet. Ich halte die überall ausführbaren, sich dem Körpertheil anschmiegenden, die Extremität nicht einschnürenden, die Wunde zugänglich lassenden und leicht abnehmbaren Gypsschienen-Verbände, wie ich sie anwende, für Zwecke des Verbandplatzes am geeignetesten, weil man zu diesem Verbande nur Gaze (oder ein anderes beliebiges Gewebe), Gyps und Furnirholz braucht, denselben jedem Körpertheile anpassen und mit der Extension combiniren kann.

Als letzten Akt der chirurgischen Thätigkeit auf dem Verbandplatze haben die Aerzte in einem Copirbuche mit telegramatischer Kürze einzutragen, was sie bei einem Verwundeten vorgefunden und was sie unternommen haben, die Diagnose, den angelegten Dauerverband, ob und was beim nächsten Verbandwechsel zu berücksichtigen ist. Ein Abdruck dieser Aufzeichnungen ist dem Verwundeten oder seinem Begleiter einzuhändigen, und der Verwundete für den weiteren Transport vorzubereiten.

Ich will nun die einzelnen Fragen behufs Discussion für die geehrte Sektion bestimmt formuliren und in Thesen zusammenfassen.

1. Die Humanität und die conservative Chirurgie erheischen es, die Annäherung der kämpfenden Truppen zu erschweren, den Bajonettangriff unmöglich zu machen, eine Deformation der Projektile zu verhüten; die Schüsse in den Weichtheilen und in den Knochen sollen mehr Lochschüssen gleichen, mit möglichster Hintanhaltung der unregelmässigen gerissenen Wunden und der Schussfrakturen; die Projektile sollen Schädel, Brust und Bauch mehr schonen und auf die unteren Extremitäten eingeschränkt sein; die den modernen Waffen eigenthümliche Explosivzone nicht zu vergrössern, und bei voller Erreichung des Kriegszweckes der Erhaltung des Lebens und der gebrauchsfähigen Glieder der Kämpfenden Vorschub zu leisten. Die Erreichung dieses Zieles ist an die Bedingung geknüpft, dem Schiesspulver eine andere Zusammensetzung mit constanter Wirkung und höherer Propulsivkraft zu geben, mit dem Kaliber auf 7.4 mm. herabgehen, die Anfangsgeschwindigkeit auf 500 bis 600 m. erhöhen, die Tragweite auf 2000 bis 2400 m. steigern zu können, und die Projektile nach der Erfindung von Lorentz in Karlsruhe einzurichten, als verschmolzene Panzer-Geschosse; Bleiprojektile mit verschmolzenem Stahlmantel werden nicht deformirt und tragen zur Erhöhung der ballistischen Wirkung bei.

2. Die erste Hilfe soll sich ausschliesslich auf die Fortschaffung des Verwundeten aus der Feuerlinie beschränken; die Wunde soll unberührt bleiben, nicht verbunden, aber lose bedeckt, gegen Staub, Regen und Fliegen geschützt werden. Nur bei

Schussfrakturen sind die Fragmente provisorisch zu fixiren (die Wunde soll bei dieser Fixirung unberührt bleiben), um den Transport des Verwundeten schmerzlos und unschädlich zu machen. Bis jetzt wird diese Fixirung durch die Lagerung der gebrochenen Extremität in eine Hohlschiene bewirkt. Hier im Lande der Erfindungen wird sicherlich eine bequemere, sicherere, für alle gebrochenen Knochen anwendbare Fixirung erfunden werden, wenn die Nothwendigkeit derselben durch die Sektion ausgesprochen werden sollte.

3. Die Zahl der für jeden Krieg disponiblen Tragbahren soll grösser sein als dieses bisher der Fall ist; dieselbe wäre organisatorisch mit 2—3 pCt. der Ist-Stärke zu fixiren. Die Tragbahren selbst sollen bequemer eingerichtet sein, keine grubige Vertiefung in der Beckengegend, dagegen seitliche Leisten haben, und so eingerichtet sein, dass der Verwundete während eines längeren Transportes schmerzlos auf der Bahre liegen bleiben kann. Die Bahre soll, auf ein zwei- oder dreiräderiges Gestell gelegt, durch einen Menschen transportirt werden können. Die Auflesung und Fortschaffung von Verwundeten aus der Feuerlinie soll ausschliesslich dem ärztlichen Hilfspersonale angehören; die kämpfende Truppe soll nicht durch die Abgabe von Blessirten-Trägern geschwächt werden.

4. Es ist die Zweckmässigkeit oder Nothwendigkeit, zu erhärten, ob und welches Mittel dem Verwundeten zu geben ist, um sich den Helfern durch ein hörbares Nothsignal vernehmbar zu machen, damit Verwundete nicht Stunden und Tage lang unaufgefunden liegen bleiben.

5. Der Hilfsplatz, sowie jede Zwischenstation wäre aufzulassen. Die Verwundeten wären direkt von der Wahlstatt auf den Verbandplatz zu bringen. Derselbe wäre 2—3 km. hinter der Schlachtlinie in gedeckter Stellung zu etabliren. Die Zahl der Verbandplätze müsste organisatorisch vermehrt werden. Eine jede Brigade sollte ihren Verbandplatz haben, eventuell aber auch eine halbe Brigade, ein Regiment und selbst eine kleinere, selbstständig kämpfende Truppenabtheilung sollte ihren Verbandplatz haben, auf welchem dem Verwundeten die erste dauernde ärztliche Hilfe zu leisten ist und von wo aus der Verwundete direkt möglichst weit in stabile Spitäler zu senden ist. Die erste Hilfe wäre daher in allen Staaten neu zu organisiren und international, überall gleichförmig einzurichten.

6. Der Begriff "Intransportabel" wäre durch Aufstellung bestimmter Indicationen zu präcisiren und auf die nur mit grossen Gefahren Transportirbaren einzuschränken. Die Verwundeten werden dann in drei Kategorien getheilt werden können: *a*) Die wirklich Nichttransportabeln (Intransportable). *b*) In solche, die unter allen Verhältnissen transportirt werden sollen (obligatorisch Transportable). *c*) Eine kleine Zahl von Verwundeten, bei denen die Entscheidung der Transportabilität der arbiträren Ansicht der leitenden Verbandplatz-Aerzte überlassen bleiben muss (facultativ Transportable).

7. Es gibt nur eine kleine Anzahl absoluter (obgligatorischer) Indikationen für die Absetzung eines Gliedes auf dem Verbandplatze. Es sind dieses solche Verletzungen, welche die Erhaltung der Extremität absolut unmöglich erscheinen lassen, und wo die Belassung der verletzten Extremität das Leben des Verletzten ernstlich gefährdet. — Schussfrakturen, durch Handfeuerwaffen erzeugt, können bei zweckmässiger Behandlung heilen, dürfen daher nicht geopfert und der Nachbehandlung entzogen werden. Die Amputation kann nach Wochen als *ultima ratio* nöthig werden. Auf dem Verbandplatze soll die Behandlung der Schussfrakturen eine conservative sein.

8. Continuitäts- und Contiguitäts-Resektionen können niemals eine *indicatio vitalis* abgeben. Primäre, frühe oder prophilaktische Resektionen haben keinen Nutzen, eher Schaden, haben daher keine Berechtigung, auf dem Verbandplatze ausgeführt zu werden. Erst in stabilen Hospitälern, wenn sich die Heilung der Verletzung ohne operativen Eingriff als unausführbar erwiesen hat, also mehrere Wochen nach der

Verletzung, erst dann ist die Indication zu einer Resektion vorhanden, erst dann tritt diese conservative Operation in ihr Recht.

9. Gefässligaturen bilden auf dem Verbandplatze keine *indicatio vitalis*, weil wirkliche Blutungen den Verwundeten getödtet haben werden, bevor derselbe auf den Verbandplatz gebracht worden ist, oder dieselben haben sich, wie dieses grösstentheils geschieht, spontan gestillt. Prophilaktische Unterbindungen sind weder nothwendig, noch nützlich und sind mit Vortheil durch die elastische Einwickelung, durch das Wasserstoff-Superoxyd und durch die Tamponade zu ersetzen, weil die genannten Mittel einfacher, sicherer und für den Verwundeten minder gefährlich als die Unterbindung sind.

10. Schussverletzungen des Bauches mit Durchbohrung und Vorfall der Därme rechtfertigen auf dem Verbandplatze die Resektion und Vereinigung der resezirten Darmstümpfe, sowie die Reposition und die Bauchnath. Auch die Laparotomie behufs Reinigung der Bauchhöhle ist auf dem Verbandplatze gestattet, als das einzig mögliche Mittel zur Rettung des Verwundeten, so gering auch die Aussicht auf einen günstigen Erfolg dieser Operation ist und so viele andere Verwundete auch auf dem Verbandplatze der ärztlichen Hilfe bedürfen.

11. Es ist zu erwägen, in wie weit sich die Methode von Curschmann in Hamburg zur Behandlung des Empyem mittelst permanenter Aspirationsdrainage auch auf die Behandlung des Hämo-Pneumo-Thorax bei Schussfrakturen der Rippen auf dem Verbandplatze anwenden lässt.

12. Die Laryngo-Tracheotomie ist bei Schussverletzungen des Halses und des Kehlkopfes, wegen Erstickungsgefahr, sowohl als *indicatio vitalis* wie auch als prophylaktische Operation auf dem Verbandplatze obligatorisch.

13. Bei Schädelverletzungen mit Bruch und Depression der Knochen ist die Extraktion von Projektilen oder fremden Körpern auf dem Verbandplatze nur gestattet, wenn dieselben ohne besonders eingreifende Voroperation ausführbar ist. Ob und was auf dem Verbandplatze bei Schädelverletzungen mit schweren Hirnsymptomen zu unternehmen ist, wird durch Ihre Discussion der Trepanationsfrage zur Entscheidung gelangen.

14. Die Schussfrakturen der Wirbelsäule erheischen, so wie jene des Oberschenkels, fixirende Verbände, welche den Rumpf stützen, die Wirbelsäule extendiren und das Mark vor einer weiteren Beleidigung durch Knochenfragmente schützen müssen. In wie weit das Gyps-Corsett von Sayre oder das Stehbett von Phelps dazu verwendbar ist, welche Modifikationen dieser Verbände, oder welche andere Methoden der Fixation und Extension der Wirbelsäule zweckmässig sind, das wird durch die Discussion in der Sektion zur Entscheidung gelangen.

15. Im Uebrigen erstreckt sich die chirurgische Thätigkeit der Aerzte auf dem Verbandplatze darauf:

Bei allen Wunden einen geeigneten, das Sekret nicht zurückhaltenden, leicht abnehmbaren, antiseptischen Dauerverband anzulegen; bei Schussfrakturen neben dem Wundverbande noch einen die Fragmente sicher fixirenden, die Wunde zugänglich lassenden, nicht einschnürenden und leicht abnehmbaren erstarrenden Verband anzulegen und denselben mit einer Extension der Fragmente zu combiniren. Meiner Ansicht nach ist der von mir angegebene Gypsschienen-Verband geeignet, diesen Anforderungen zu entsprechen. Endlich ist in einem Copirbuche Nationale, Anamnese, Diagnose und Therapie mit telegramatischer Kürze einzutragen, dem Verwundeten eine Copie dieser Aufzeichnungen einzuhändigen und denselben für den Transport in die stabilen Anstalten vorzubereiten und den Transport zu veranlassen. —

Ich würde mich freuen, wenn das Ergebniss unserer Berathungen die Ueberzeugung reifen würde, dass die Fortschritte der Humanität und der conservativen Chirurgie mit den Fortschritten in der Waffentechnik und der modernen Kriegführung mit ihren kolossalen Heeressäulen gleichen Schritt zu halten vermögen.

Möge es dem Congresse mit seiner hohen Autorität gelingen, die Regierungen zu den hier angeregten Mehrausgaben zu bestimmen, welche in gleicher Weise zur vollen Ausnützung der Fortschritte der modernen Waffentechnik wie jener der erhaltenden Chirurgie nöthig erscheinen; dann dürfte schon der nächste Krieg die glänzenden Ergebnisse der conservativen Chirurgie als Triumph der Humanität der dritten Sektion des neunten internationalen Congresses zu danken haben.

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# THE PROPER TREATMENT OF PENETRATING WOUNDS OF THE JOINTS.

## DU MEILLEUR TRAITEMENT DES PLAIES PÉNÉTRANTES DES ARTICULATIONS.

## ÜBER DIE RICHTIGE BEHANDLUNG PENETRIRENDER GELENKWUNDEN.

BY FREDERICK HYDE, M. D.,

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(Deceased since the Congress.)

In considering the treatment of penetrating wounds of joints, we are to keep in mind their anatomy and physiology. The mechanism of a perfect joint, embraces a given number of textures and tissues, affording an instance in which each has its own distinct structure and office, essential to the economy of the joint. When one or more of the joint textures are involved in traumatic lesion, each will observe its own phenomena, as the synovial, the cartilaginous, the ligamentous, the ossific, and connective. If the disease be primary in one, it does not follow but that, sooner or later, all the textures directly, or consecutively, may be involved, thus presenting a multiple group of the once distinct structures of the normal joint, each subject to its own mode of exhibiting its morbid processes and form of degeneration. The closer the wound—whether large or small—resembles the incised, the simpler is its character.

A wound into the interior of a joint may be made by such form of missile, as to partake of the incised, the lacerated, contused, and punctured wound. The character in this respect should be clearly detected by the surgeon, that he may direct its appropriate treatment. The fundamental principles which should govern the treatment of penetrating joint wounds are generally clear, their modifications being required by the different size of wound, depth of cavity, and the extent of synovial texture. Especially is this exemplified in the knee, with its relations to the more liberal bursal provisions, than in most of the other joints. The large synovial membrane of the knee-joint holds a more important practical relation to its neighboring bursa, than any other joint, in connection with successful drainage while suppuration is progressing. This is well illustrated in the chronic residual abscesses, complicated with bursal communication of the purulent collections. Punctured wounds in joints, as in other structures, are liable to be followed by serious results, and it is true, too, that they do occur in joints, occasionally followed by the most favorable mode of repair. Such are examples where the puncture is made by such missiles, and in such relation to the tissues, as to leave the lesion more an incision than in the average contusion of punctured wounds; the patient being in good health before the injury, and immediate immobility of the wounded textures as well as of the patient's entire body, secured, it makes, as far as possible, a sub-integumental wound. Several such examples have come under my care,

in which the puncturing agents were found in the wounds; but their removal before the joint or body of the patient was put in motion, within a few days, was followed by complete recovery, the wound not inflaming. It has not always been quite so easy to recognize at once the presence of the synovial fluid as positive proof of the wound into the joint cavity, on account of its mingling with the other exuded materials of the wounded parts. Again, the large size of the synovial membrane of the knee allows it, when opened, sometimes to leak its contents through a wound of one or more bursæ, while there is no direct route between the synovial sac and the former. The great extent of synovial tissue of the knee, as well as the large amount of bursal texture in the vicinity of this joint, bear directly upon the extension of inflammation when they are included in the primary lesion. The inflamed synovial sac, as well as the bursal, furnish a typical example of the rapidity with which the inflammatory process extends by continuity of texture, as often witnessed in the short time after a slight wound of the synovial sac has been made, ere the inflammation has extended throughout the entire membrane, often before it has attacked the contiguous textures. Early appropriate treatment has been followed by resolution, with no traces of having implicated the adjacent structures.

But, when the inflammation is allowed to progress, it often occurs that suppuration of the synovial sac extends rapidly above the patella; behind the quadriceps muscle; in front of the femur, and this communicating by a free opening with the joint sac. Allowing that this bursa does not always exist as a defined sac, here there is abundant loose connective tissue, which will allow a ready flow of putrid pus, which readily finds its way high up the thigh, and when we open what we hope is a limited abscess, it proves to be diffuse, and of much greater gravity. The lower parts of the synovial sac hold the same relative relations as the superior do. There are certain positions of the knee when the sacs are shut off from each other, a fact to be kept in mind when a thorough drainage is needed in the extensive suppurations in the lower part of the joint, as well as when the pus is burrowing low down the leg, quite beyond the synovial limits. It does not follow in all cases, that a penetrating wound of a joint will show the first signs of inflammation in the synovial tissue, but may be detected first in one or more of the other structures, spreading by contiguity of texture. But it is true that, when the inflammation begins in the bone structure, it is not restricted to this tissue, as when it primarily follows upon a lesion of the synovial sac. It is the great extent of synovial membrane, to many square inches in the sac, and its bursal relations, which has led me to speak so fully of this tissue, for the bearing it has on an important part of the modern treatment of joint wounds, to wit, complete drainage in both early and late suppuration, that all poisonous, purulent material be early and wholly evacuated. When we call to mind how often and early, acute synovial suppuration takes place to the extent of one large abscess with suppurating pockets, and how often connected with bursal suppuration, we can realize how the drainage may be only partially done.

What should the surgeon do when called to treat a penetrating wound of the knee joint? First, if there is hemorrhage, he should arrest it. Second, he should care for the shock. Does the wound, whether incised, lacerated, punctured, or contused, contain any form of foreign material? If so, it should be removed as soon and completely as possible, remembering that blood or any other of the tissues now dead, are included as foreign substance. Pain should be abated. In removing the foreign body, if it cannot be done completely without enlarging the wound, this should be done without delay. The wound, having been well cleaned in every particular, should be accurately closed, each tissue to its kind, if possible. Entire immobility of the joint and patient's body should be maintained. The joint should be lightly covered, kept moist with moderately cool carbolized water; the dressing to be of even temperature.

What should be done with the wound of a joint when there is loss of textures, as in lacerated, contused, and gunshot injuries, often involving the greater amount of all the tissues of the joint, when it would not be possible to coaptate the wound properly? There is a lesion in which the first question to be decided is, Should an amputation be made?

If answered in the negative, then its dressings and treatment should be directed with a view to insuring the best repair, modifying it as the varying conditions will suggest. From the first dressing, the care should be, not to leave the least amount of purulent material in any part of the joint structures or in their immediate vicinity to serve as a cause of sepsis, as it surely would be, to be followed by a rapid wasting of patient, arresting the nutrition of all the tissues. In the more extensive joint injuries in which the ossific textures are involved, the suppuration is aggravated by exfoliated bone and sequestra, which are a constant cause of irritation, contributing to the extension of the disease and exhaustion of the patient. The now foreign substances, much oftener make their presence known, when ready for extrusion, but I have known examples where, without great care in searching for them, they remain confined, and continue to provoke continued suppuration.

Needless explorations of a diseased joint are sinful; but it is equally bad surgery to neglect to watch closely, that a necrosed fragment of a bone, ligament, or tendon is not left in, when it can be removed. The writer has in mind some marked examples of foreign bodies, so imprisoned in penetrating joint wounds, as to cause continued suffering and suppurative exhaustion, until amputation became necessary to save life. Upon examination of the amputated member, it was proved, in a case of gunshot of the ankle, that a minie ball had penetrated the interior of the joint and wedged itself in the lower end of the tibia in the cancellous tissue, the ball having perforated the articular surface of the tibia. When found, it was two and a half inches from the articular surface, surrounded by degenerate pus, the cancellous tissue gone for two inches and a half above the ball, the inner surface of the compact part of the bone lined with pale pus granulations, representing the wall of the abscess; the outer wall of the tibia was so much attenuated that, with but little force, it was fractured. The subject of this case was a soldier in the late American rebellion, and carried this ball about three years after he left the service, there being scarcely a day in this time that he did not have a purulent discharge from one or more openings in the limb. Numerous examples have come under the writer's observation, where other missiles, or what became more foreign material than leaden balls, have become so fixed in a diseased joint as to escape detection, and finally amputation revealed the situation.

The wise conservative spirit of surgery, that forbids the opening of a diseased joint, should yield its caution when suppuration is a marked feature of the case. The imperative rule is, that in all cases, pus should not be allowed to remain in a joint any more than in any other situation, when it can be evacuated. The hip, knee, ankle and elbow joints, when subject to penetrating wounds, have, oftener than any others which have come to my knowledge, furnished cases of undetected foreign substances, including more frequently bone fragments, than in the other joints. The cases of gunshot wounds in these, have shown either the original penetrating bodies, or necrosed bone, to be the offending agent, the cause of the protracted suppuration and additional tissue destruction. Finally, as a last resort for life, amputation or resection have demonstrated the presence of the foreign agent.

Fragments of articular cartilages, as they are shed in the progress of bone destruction, become offending foreign material. Whatever the cause or causes of inflammation in the different joint structures, the longer suppuration continues, the more unfavorable is the prognosis; the more readily do the adjacent tissues, on account of their mal-nutrition, become incapable of affording reparative material; the general wasting goes on still

more rapidly; finally, hoping to save the life, an amputation is made. The writer has met with several cases of epiphyseal separation in the progress of joint disease, in patients of early life, in the knee, ankle and elbow, these acting before or after disintegration as additional irritants, protracting suppuration, the same as other foreign substances, and should be treated in the same way by early removal.

Is it said that the treatment urged in this paper is too radical? We repeat, that as soon as pus is known to exist in a joint it should be evacuated as completely as possible, as a strictly conservative measure, to be followed with the drainage of all purulent, poisonous material; that all foreign substances, and other ulcerous débris, too gross for drainage, should be at once removed, and never left to the chances of spontaneous extrusion. The practice which secures complete riddance of all that irritates and poisons, both locally and generally, is conserving so far, that if it does not correct the disease in time for restoring a good joint, it may save an imperfect one, which is a triumph over the sacrifice of an arm or leg.

Short of the treatment in question, the large amount of morbid surfaces involved could not be reached by irrigation with antiseptics, an indispensable part of the later surgical therapeutics of arthritic disease. When the surgeon contrasts the progress and results of his earlier treatment of joint wounds—forbidding the opening of a suppurating synovial sac, allowing it to open itself, leaving all manner of detritus, to add to the spread of the disease, himself watching the rapid emaciation of his patient, and, as a last resort for life, only the precarious chances of amputation—with his treatment of to-day, he will call the former the spoliative, and the latter the saving treatment.

The constitutional treatment consists in the use of such means as will best sustain the general health. In the earlier, more acute stage of the inflammation, due caution should be observed that the treatment for resolution should have reference to its chances of failure. In such event, the physical powers will need to be protected against the exhaustion, following upon the destruction of tissues incident to the chronic period of the disease. In traumatic joint-wounds of patients laboring under any of the dyscrasia, the prognosis is always more unfavorable for securing resolution of the inflammation. It is equally unfavorable when suppuration has occurred, especially if it begins in the ossific tissue. The treatment should have early reference to the previous constitutional conditions. In this class of cases, should the surgeon amputate early, he cannot predict, though the stump heal kindly, a long exemption from death. This may result from the systemic unsoundness existing anterior to the wound of the joint.

## CONCLUSIONS.

1. The anatomical structures composing a joint, with their functions, is to be borne in mind by the surgeon, as he studies any form of wound opening into its cavity.

2. The close proximity of the textures of the joint render a penetrating wound, of proportionate gravity to the intensity of the inflammation liable to follow in the several tissues involved.

3. The first result of the inflammation is perversion of function; second is textural change.

4. The character of the wound, whether incised, lacerated, contused, punctured, or poisoned, will influence the inflammation in its greater or less destruction of tissues.

5. When the lesion, small or great, is restricted primarily to the synovial texture, the inflammation is more likely to spread in the same more rapidly, not involving the adjacent textures until later.

6. Bearing upon the treatment of penetrating joint wounds, the synovial tissue. and

its relations to the bursal structure, should be in the surgeon's eye, that the requisite drainage may be kept up.

7. That in all examples of suppuration of a joint, a direct opening should be made for its entire evacuation; that pus in a joint soon degenerates and is then poisonous, as in all other purulent collections.

8. Amputation should be made when it is the only means of saving life.

9. Exsection of the joint should be practiced as a compromise with amputation, as less dangerous to life, and promises to the patient the use of the limb, though it be shortened and imperfect; but we are not to forget that this operation has attained its most signal achievements when applied to joints of the upper extremities.

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# PENETRATING INJURIES OF JOINTS, ESPECIALLY GUNSHOT WOUNDS.

## DES PLAIES PÉNÉTRANTES DES ARTICULATIONS, SURTOUT DE CELLES QUI RÉSULTENT DES ARMES À FEU.

## ÜBER PENITRIRENDE GELENK-VERLETZUNGEN, BESONDERS SCHUSSWUNDEN.

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Penetrating injuries of joints, for many reasons, are especially apprehended by the surgeon. Their immediate effects are often extremely disproportionate to their terminal results. Penetrating wounds of other cavities, cranial, thoracic, and abdominal, carry with them, to the sufferer and to the beholder, a partial knowledge of their gravity; but a small penetrating injury of a large joint, causing little pain and hemorrhage, and impairment of motion in only a small degree, producing slight apparent damage, lulls the courageous victim in the euthanasia of a false hope, and influences sympathizers to denounce as professional "hydras and chimeras dire" the alarming diagnosis and prognosis of the experienced surgeon, and to condemn his recommendation of heroic treatment.

### I. CLASSIFICATION.

The name of the injury describes its character. It is the opening of the cavity of a joint, caused by direct impact of a foreign body, or by indirect violence.

The wounds may be classified as (1) incised, (2) punctured, (3) lacerated, caused by sword, knife, dirk, bayonet, or any pointed or cutting instrument or fragment; (4) contused, (5) comminuted, (6) gunshot, caused by bullet, shell, or fragment of shell, or any blunt projectile. This paper considers principally the last two varieties.

### II. FREQUENCY.

These gunshot injuries rarely occur in civil practice. If the person is wounded, willfully, by himself or by another, the attempt is made to hit the head or the trunk; if wounded accidentally, the joints are liable to be implicated only in the proportion which their superficial surface bears to that of the whole body.

In military practice these injuries are not infrequent. They occur more often in modern than they did in ancient warfare, when

"Rome's stout pilum in a stout Roman hand,"

and the lance of the legionaries, were the offensive weapons; troops fought hand to hand, and inflicted injuries of head, and trunk and arms, rarely penetrating the joints, which were especially protected; although Macaulay tells us that at the Battle of Lake Regillus

"Mamilius smote Æbutius, with a good aim and true,
Just where the neck and shoulder join, and pierced him through and through."

In modern warfare bullet and shell, making obsolete sword and lance, at long or short distances, with utter impartiality, wound every part of the human anatomy. The soldier is the unprotected target. During the last years of the War of the Rebellion, much of the long-distance fighting was from extemporized rifle pits, which protected head and neck and trunk, and this fact may partially account for the difference in the percentage of regional wounds of our own and of foreign wars.*

### III. DIAGNOSIS.

The diagnosis of a penetrating wound, in some cases, may be settled by the most cursory examination, or may remain in doubt after a most careful and exhaustive one.

Peri-articular injuries closely simulate and often become penetrations. In examinations, the finger is always to be preferred; it furnishes more definite information than the probe, and is less liable to injure. The symptoms widely vary. The shock may be slight or profound; the pain trifling or severe; impairment of motion imperceptible, partial or complete; symptoms also common to peri-articular wounds. The escape of synovial fluid, however, is diagnostic.

The resulting symptoms are inflammation of the synovial membrane and superimposed tissue, and primary or secondary inflammation of the articulating bones, as they may, or may not, have been implicated in the original injury. After injury of large joints, constitutional symptoms quickly supervene.

### IV. PROGNOSIS.

The prognosis depends, other things being equal, upon the nature and the velocity of the missile, the destruction of tissue, and the importance and anatomical structure of the joint. The military surgical adage obtains, that the danger from joint injuries is inversely to their distance from the trunk, excepting in the case of the knee, which,

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* General percentages of wounds in the region of

| | War of Rebellion. | Foreign Wars. |
|---|---|---|
| Head, face and trunk | 10.7 | 14.4 |
| Trunk | 18.4 | 21.1 |
| Upper extremities | 35.7 | 30.7 |
| Lower extremities | 35.1 | 33.8 |

"Medical and Surgical History of the War of the Rebellion," S. G. O., Vol. III, page 690. The full table is copied on page 179 of this volume.

During the War there were reported, of all varieties of wounds..... 245,739.

| | |
|---|---|
| Of these, the wrist was involved in | 1509 |
| the elbow " | 2816 |
| the shoulder " | 1579 |
| the ankle " | 1711 |
| the knee " | 3355 |
| the hip " | 386 |

from the extent of its synovial membrane, and from the size of its articulating surfaces, has a prognosis in gravity second only to that of the hip.*

The percentages of fatal results are :—

| | | | |
|---|---|---|---|
| Wrist joint | 12.9 | Ankle joint | 26.9 |
| Elbow joint | 19.4 | Knee joint | 53.7 |
| Shoulder joint | 34.2 | Hip joint | 84.7 |

"Medical and Surgical History of the War of the Rebellion," Vol. III, p. 870.

## V. TREATMENT.

Treatment should be adapted to the individual case. Experience and judgment find, in the care of these injuries, their most responsible exercise.

All injuries should be cleansed, foreign substances removed, and the joint comfortably and permanently fixed. Incised and punctured penetrating wounds, uncomplicated, generally recover under primary antiseptic dressings; if suppuration has been established, free drainage and antiseptic injections are required.

Lacerated, contused, comminuted and gunshot wounds of joints of smaller size, should be freed from badly lacerated tissue and denuded fragments of bone; their anatomical relations reëstablished as accurately as possible, and aseptically composed.

Constantly realizing how differently the same joint may be injured, and how different may be the appropriate treatment, we may better appreciate the value of conservation and heroic measures, as detailed in the subjoined table† relating to the

* The subjoined table shows approximately the relative danger of the intermediate and large joints :—

TABULAR STATEMENT OF NUMBER AND RESULTS OF JOINT INJURIES DURING THE WAR OF THE REBELLION.*

| Locality. | Total. | Recovery. | Fatal. | Undetermined. | Percentage of Fatal. |
|---|---|---|---|---|---|
| Wrist joint | 1,509 | 1,305 | 193 | 11 | 12.9 |
| Elbow joint | 2,816 | 2,211 | 532 | 73 | 19.4 |
| Shoulder joint | 1,579 | 948 | 492 | 139 | 34.2 |
| Ankle joint | 1,722 | 1,247 | 460 | 15 | 26.9 |
| Knee joint | 3,398 | 1,566 | 1,819 | 13 | 53.7 |
| Hip joint | 386 | 59 | 327 | ... | 84.7 |

* "Medical and Surgical History of the War of the Rebellion," Vol. III, page 870.

These cases include all reported, whether treated by conservation or by operation; they are not, in the hip-joint injuries, and perhaps in others, believed by their compiler, Surgeon Otis (M. and S. History, S. G. O. Vol. III, page 88), to be accurate, as he doubts the correctness, in some cases, of the original diagnosis, thinking peri-articular injuries had been mistaken for penetrating wounds.

† NUMBER AND RESULTS OF DIFFERENT METHODS OF TREATMENT IN GUNSHOT INJURIES OF INTERMEDIATE JOINTS.*

| Locality. | Conservation. | | | | Excision. | | | | Amputation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total. | Recovery. | Fatal. | Undetermined. | Total. | Recovery. | Fatal. | Undetermined. | Total. | Recovery. | Fatal. | Undetermined. |
| Wrist joint | 716 | 653 | 54 | 9 | 109 | 94 | 15 | ... | 684 | 558 | 124 | 2 |
| Elbow joint | 938 | 828 | 96 | 14 | 731 | 518 | 159 | 54 | 1,147 | 865 | 277 | 5 |
| Shoulder joint | 541 | 383 | 149 | 9 | 835 | 432 | 277 | 126 | 203 | 133 | 66 | 4 |
| Ankle joint | 525 | 414 | 99 | 12 | 33 | 22 | 9 | 2 | 1,164 | 811 | 352 | 1 |

* "Medical and Surgical History of the War of the Rebellion," Surgeon General's Office, Vol. III, pages 870–871.

several methods of treating injuries of intermediate joints and the shoulder joint. From this table have been computed the percentages of successful results of conservation, excision and amputation.

| | Conservation. | Excision. | Amputation. |
|---|---|---|---|
| Wrist joint..... | 91.2 | 86.2 | 81.6 |
| Elbow joint..... | 88.2 | 70.8 | 75.5 |
| Shoulder joint..... | 70.7 | 51.7 | 65.5 |
| Ankle joint..... | 78.8 | 66.6 | 69.6 |

Military surgeons generally, from the experience of our own and previous wars, concluded in regard to the hip joint, that, if justified by other conditions, the actual injury should be recognized by enlargement of the wound and primary excision performed; this decision is confirmed by later experience.

They concluded that, when the articular surfaces of the knee had been comminuted or fractured, the thigh should be primarily amputated, and that conservation or excision were not justified in field operations. This opinion was practically unanimous; among the many authorities quoted by Surgeon Otis are these :*—

Surgeon Squire, 89th N. Y., reports: "Every knee joint fractured by a ball should be amputated, and the quicker the better."

Surgeon Judkin: "I had three cases here of gunshot injury of knee joint, admitted when all hope of successful issue in the removal of the leg by amputation had passed away. They all died. The operation should have been performed on the field."

Surgeon Woods, 99th Ohio: "If bony structure is involved, the only warrantable procedure is amputation; the attempt to save the limb is no less than a wanton robbing of the unfortunate sufferer of the only chance for life."

Dr. Hunter McGuire, a Confederate Medical Director, saw a large number of these injuries, but "not one which recovered without amputation;" whenever the surgeon persisted in his efforts to save the limb the patient died.

Of the experience in foreign wars Surgeon G. I. Guthrie, of England, says: "Wounds of the knee joint, with fracture of the great bones composing it, from musket balls, require amputation." Commenting on the war in Spain, Portugal, and France, he remarks: "Wounds of the knee joint from musket balls, with fracture of the bones composing it, require immediate amputation."

Esmarch says: "All shot wounds of the knee joint, in which the epiphysis of the femur or tibia has been injured, demand immediate amputation of the thigh; this is a deplorable sentence, already given by the best authorities, and which our experience has fully confirmed."

McLeod remarks: "Taking much interest in cases of this description, I visited every one I could hear of in camp, and can aver that I have never met with one instance of recovery in which the joint was distinctly opened and the bones forming it much injured by a ball, unless the limb was removed."

C. F. Lohmeyer writes: "When the capsule is opened, and the condyles of the femur and tibia are injured, the prospect for the preservation of the limb—and, should the latter be attempted, for the preservation of life—is very poor. Therefore, amputation of the thigh is always indicated in such wounds, and is to be performed as early as possible."

The following table † gives the results of the different methods of treatment during our War.

| Locality. | Conservation. | | | | Excision. | | | | Amputation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Total.* | *Recov.* | *Died.* | *Und.* | *Total.* | *Recov.* | *Died.* | *Und.* | *Total.* | *Recov.* | *Died.* | *Und.* |
| Knee joint. | 901 | 360 | 532 | 9 | 56 | 9 | 44 | 3 | 2441 | 1197 | 1243 | 1 |

* "Medical and Surgical History of the War of the Rebellion," Vol. III, p. 411 *et seq.*

† "Medical and Surgical History of the War of the Rebellion," Vol. III, pages 870-871.

These statistics might seem not to warrant the military decision. It should be remembered, however, that they include all cases of contusion, fracture of patella, incision and puncture; that the joint was not always penetrated, nor the articulating surfaces comminuted or fractured, and that probably the operative procedures were frequently performed when the attempt to save the limb had robbed the operation of its best chance of success.

In the Russo-Turkish war, 1877, Prof. Bergmann claims to have treated 31 cases of gunshot wounds implicating joint and articulating surfaces, with 20 recoveries, 9 deaths, and 2 undetermined.

The motions of the joint, in the cases claimed as recoveries, is generally much impaired.

On the 4th of July, 1873, a girl, æt. 13 years, of cheerful disposition and in excellent health, was wounded in the knee by a bullet of about 38 to 40 calibre. The rifle, or pistol, never discovered, must have been discharged some distance away. First seen within one hour of the accident. There was little shock or pain; mobility unimpaired, but painful; no pronounced hemorrhage, but oozing of synovial fluid and diluted blood. The wound of entrance was upon the internal aspect of the right knee; some fibres of cloth in its track; no wound of exit. Digital examination determined a grooved laceration, of about equal depth, of the articulating surfaces of the femur and tibia, large enough to admit the end of the finger; continued examination externally, and internally with the finger and probe, failed to locate the missile; pulverized bone was felt in the cavity as far as the finger reached, and was removed. The wound and joint were cleansed and washed out, cold water dressings applied, and the leg placed in a comfortable, semi-flexed position. This was the antiseptic treatment at that time.

The serious and alarming nature of the injury, and the experience of army surgeons, were fully explained to the friends and to the patient. They could not appreciate the gravity of a wound causing so slight apparent damage, and, taking the responsibility, demanded expectant treatment.

Synovitis and peri-articular inflammation soon supervened; rigors, fever, some suppurative discharge, all too surely testified that the case was progressing unfavorably, notwithstanding ice-water irrigation and other antiphlogistic attempts. The knee was then packed in ice, and as it gave local and general relief, the ice poultice was constantly and continuously renewed for three or more weeks. Finally, after two months, the wound healed, and the knee, at first stiffened, regained complete motion.

Upon the 4th of July, 1887, fourteen years after the injury, the knee was examined.

Motion symmetrical and complete, equal in both right and left leg. Scar oval, one inch in the long, three-fourths of an inch in the short, diameter, adherent, sensitive; its centre two and a half inches from the inner border of the patella; groove in tuberosity of tibia evident, but not in the condyle of the femur. The measurements were:—

| | Circumference at lower border. | Middle and upper border. | Of patella. |
|---|---|---|---|
| Right leg..... | inches 14½ | 16 | 16¼ |
| Left " ..... | " 13¾ | 14¾ | 15½ |

Patient has recently suffered from rheumatism, affecting the right hand and right knee: this may partially account for the enlargement of the right knee, although no other joints are enlarged.

This lady, considerate of the desires of the profession, to which she owes so much, has signified her willingness that, when she has no further use for the knee, the surgeons may verify the diagnosis, recover the missile, and contribute the anatomical specimen to the Army Medical Museum.

RELATIVE FREQUENCY OF SHOT WOUNDS OF THE DIFFERENT REGIONS OF THE BODY.*

| Occasions and Authorities. | Cases. | Head, Face and Neck. | | Trunk. | | Upper Extremities. | | Lower Extremities. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Percentage. | Cases. | Percentage. | Cases. | Percentage. | Cases. | Percentage. |
| Revolution in Paris, 1830 (Ménière, Jobert, (De Lamballe)) | 627 | 40 | 6.4 | 117 | 18.7 | 193 | 30.8 | 277 | 44.1 |
| Revolution in Paris, 1848 (Baudens, Huguier, Jobert (De Lamballe) | 413 | 46 | 11.1 | 77 | 18.7 | 116 | 28.1 | 174 | 42.1 |
| Schleswig-Holstein War, 1848–51 (Simon Djorup) | 6,355 | 949 | 14.9 | 1,006 | 15.8 | 1,804 | 28.4 | 2,596 | 40.9 |
| Crimean War, 1854–57, English (Matthew) | 9,971 | 2,000 | 20.1 | 1,500 | 15.0 | 3,089 | 31.0 | 3,385 | 33.9 |
| Crimean War, 1854–57, French (Chenu) | 25,993 | 5,263 | 20.2 | 4,937 | 19.0 | 8,238 | 31.7 | 7,555 | 29.1 |
| Campaign of the Kabylie, 1854–57 (Bertherand) | 1,422 | 220 | 15.5 | 249 | 17.5 | 267 | 18.8 | 686 | 48.2 |
| Mutiny in India, 1858–59 (Williamson) | 558 | 60 | 10.8 | 52 | 9.3 | 212 | 38.0 | 234 | 41.9 |
| Campaign in Italy, 1859, Austrian (Demme) | 17,095 | 2,050 | 12.0 | 8,750 | 21.9 | 6,047 | 35.4 | 5,248 | 30.7 |
| Campaign in Italy, 1859, French (Chenu) | 15,401 | 1,514 | 9.8 | 2,265 | 14.7 | 5,378 | 34.9 | 6,244 | 41.1 |
| Campaign in New Zealand, 1863–65 (Mouat) | 48 | 8 | 16.7 | 15 | 31.2 | 12 | 25.0 | 13 | 27.1 |
| French in Mexico, 1864 (Bintot) | 66 | 11 | 16.7 | 10 | 15.1 | 20 | 30.3 | 25 | 37.9 |
| Schleswig-Holstein War, 1864 (Lorffler) | 3,171 | 458 | 14.4 | 614 | 19.4 | 925 | 29.2 | 1,174 | 37.0 |
| Austro-Prussian War, 1866, Germans (Mass, Biefel, Stromeyer, Beck) | 2,282 | 218 | 9.5 | 410 | 18.0 | 591 | 25.9 | 1,063 | 46.6 |
| Austro-Prussian War, 1866, Italians (Cortese) | 2,811 | 333 | 11.8 | 529 | 18.8 | 761 | 27 1 | 1,188 | 42.3 |
| Revolt in Montenegro, 1869 (Riedl and Edner) | 118 | 17 | 15.8 | 16 | 14.8 | 40 | 37.0 | 35 | 32.4 |
| United States Army, 1865–70 (Otis) | 387 | 83 | 21.4 | 145 | 37.5 | 79 | 20.4 | 80 | 20.7 |
| Franco-German War, 1870–71, Prussians (Fischer) | 53,482 | 7,880 | 14.7 | 8,835 | 16.5 | 17,795 | 33.3 | 18,972 | 35.5 |
| Franco-German War, 1870–71, Bavarians (Beck) | 4,344 | 611 | 14.1 | 772 | 17.8 | 1,174 | 27.0 | 1,781 | 41.1 |
| Franco-German War, 1870–71, French (Chenu) | 71,443 | 9,376 | 13.1 | 20,243 | 28.4 | 19,588 | 27.4 | 22,236 | 31.1 |
| Russo-Turkish War, 1876–77 (Tiling, Kade) | 371 | 47 | 12.7 | 41 | 11.1 | 146 | 39.3 | 136 | 36.9 |
| Totals | 216,348 | 31,184 | 14.4 | 45,583 | 21.1 | 66,475 | 30.7 | 73,106 | 33.8 |
| War of the Rebellion in United States of America, 1861–65 | 245,739 | 26,400 | 10.7 | 45,184 | 18.4 | 87,793 | 35.7 | 86,413 | 35.1 |
| Aggregates | 462,087 | 57,584 | 12.5 | 90,767 | 19.6 | 154,268 | 33.3 | 159,519 | 34.5 |

* "Medical and Surgical History of the War of the Rebellion," Vol. III, page 693.

# WHAT IS THE PROPER TREATMENT OF PENETRATING WOUNDS OF JOINTS?

## QUEL EST LE TRAITEMENT PROPRE DES BLESSURES PÊNÉTRANT LES JOINTURES?

## WELCHES IST DIE RICHTIGE BEHANDLUNG PENETRIRENDER WUNDEN DER GELNKE.

BY PROF. JOSEPH D. BRYANT, M. D.,

Surgeon General of the New York National Guard, New York City.

The proper treatment of these wounds can be established best by, first, taking into consideration the evil effects that follow them; second, by adopting the measures best calculated to obviate or lessen these effects. The evil effects that follow these wounds manifest themselves on the constitution of the patient and on the part injured. The localized ill effects are due, first, to the variety and degree of the injury; second, to the septic or aseptic state of the wound; third, to the presence of foreign bodies in the joint; fourth, to the method of treatment employed.

The constitutional effect of an injury of this kind is embraced practically under the word Shock. The shock may be ascribed to the loss of blood, or to the effect on the nervous system of the injuries received by the joint structures. The proper treatment for these elements of the general effect of injury is already too well established, to be unappreciated by any surgeon.

The variety and extent of the wound which a joint receives, depends largely on the physical characteristics and the impetus of the agent by which it is inflicted. The consideration of recent punctured, incised and gunshot wounds of joints, is sufficient for the practical purposes of this paper.

The local features of a gunshot wound may have associated with them certain of the strong distinguishing appearances of contused and lacerated wounds; especially if the missile have caused an extensive comminution and displacement of the bony fragments. It should now be stated, that the proper treatment of any wound is a matter that is controlled largely by the circumstances surrounding the case. The proper treatment of a wound that is received on shipboard, or on battle field in the midst of active strife, is, from necessity, different in technic from that which is employed in civil life. In the latter, the details of a single case alone engross the surgeon's attention; in the former, however, the surgeon's efforts must be directed to the accomplishment of the greatest good to the greatest number. In view of the facts last stated, it seems to me that the indications for treatment should be first considered, and that the promptness of their recognition, and the efficiency of their application, will be largely controlled by a wise anticipation of the exigencies of the occasion calling for them.

The indications for the treatment of penetrating wounds of joints are:—

*First.* To arrest hemorrhage, and to exclude septic influences from the cavity of a joint. Each of these aims can be met promptly and satisfactorily at once, by applying an antiseptic compress firmly over the wound. This compress, if for use on the field of battle, should be carried by each of the soldiers, who should have been instructed in the method of its application. If the hemorrhage be not controlled by this measure, then a tourniquet should be applied for the purpose.

*Second.* The earliest possible removal (with all available care) of the patient to a place suitable for active treatment. This indication refers not only to caution in carrying the patient, but also in moving the limb and in excluding septic influences from the wound.

*Third.* This indication requires that the exposure and examination of the wounds, the operative treatment, and subsequent surgical attentions, be conducted with every possible antiseptic forethought.

*Fourth.* The wounded joint should be immobilized, and extension should be applied when it is necessary to relieve the pain due to muscular action.

### TREATMENT OF PENETRATING PUNCTURED WOUNDS OF JOINTS.

If the wound be a recent one, and if the opening into the joint cavity be small, and have been closed by escaping synovial fluid; if inflammation of the joint has not taken place, and foreign bodies be not present in it; then the wound may be closed by catgut sutures carried down to the synovial membrane, and dressed antiseptically.

However, if the penetrating agent were of a septic nature, or if inflammation of the joint have taken place, or air, or pus, or a foreign body be present in it, or other local adverse conditions have occurred, the wound should be thoroughly purified with an antiseptic solution; dependent through-and-through drainage established; the unused portion of the wound of the soft parts should be closed with a deep and a superficial row of continuous catgut sutures, and dressed antiseptically. If extensive suppuration have taken place in a joint cavity, or in the tissues surrounding it, several free, liberating incisions should be made, of a sufficient depth to permit the complete evacuation of all purulent or septic products. A liberal dependent drainage is then provided, and the tissues and the joint cavity freed of all septic matters by careful douching and sponging with an antiseptic fluid. It may be necessary even to scrape away the baneful products that will not yield their hold to milder means. Wounds of joints, like those of outer parts of the body, are to be kept free from the products of suppuration and decomposition, at all times. The synovial pouches that are hidden behind the condyles, tuberosities and processes of joints, and also those that communicate with the joints that are beneath the tendons of muscles that move the joint, must be carefully examined, thoroughly purified, and amply drained.

### TREATMENT OF INCISED PENETRATING WOUNDS OF JOINTS.

The treatment of incised wounds of joints, is substantially similar to that for punctured wounds, because the indications for the treatment of each variety are practically alike. It may happen, however, that the tendons of important muscles, ligaments, nerves, and even portions of the bones of a joint, have been severed by the incisive force. If such be the case, the divided extremities of each of the soft tissues should be sewed together with silkworm gut, fine silver wire, or any other agent suitable for the purpose, before the final dressings are applied. The bony fragments, too, may be united to the main shaft by similar means, provided that the prospects of a union make the step expedient.*

### TREATMENT OF PENETRATING GUNSHOT WOUNDS OF JOINTS.

If a missile that is propelled by the force of powder penetrate a joint, the tissues composing that joint are usually more or less damaged, or disorganized entirely. It happens also, not infrequently, that the contiguous vessels and nerves are injured seriously, or have had their functions destroyed by the violence.

While the different routes a missile may take, and the various effects it may produce on the structures of a joint are numberless, still, for the purposes of practical illustration, it may be assumed that one of the following results will happen:—

(1) The ball may pass through the cavity of a joint entirely, or communicate with it, without injury to the bony or cartilaginous structures.

(2) It may enter the joint and remain loose in the cavity.

(3) It may enter the joint and be embedded in the head of a bone, more or less completely.

(4) It may pass through the joint or remain in it, after having caused fracture of the bones of the articulation.

(5) It may enter the joint and pass through the bone without causing a fracture.

(6) It may enter the joint and cause more or less comminution of its bony structures.

(7) It may implicate the joint cavity, and destroy also the contiguous vascular and nervous supply.

The Local Treatment of penetrating gunshot wounds of joints will be considered as conservative and operative.

(1) If the ball have passed through the joint, or have communicated with the cavity, without doing apparent damage to the bony or cartilaginous structures, the following special treatment will suffice: (*a*) Arrest hemorrhage. (*b*) Remove the shreds of clothing and outer foreign bodies from the wound and from the joint cavity. Increase the size of the opening when it is necessary for the accomplishment of these purposes. (*c*) Irrigate the cavity thoroughly with an antiseptic fluid. (*d*) Establish dependent drainage, by either making new openings, or utilizing the old ones. (*e*) Dress the wound antiseptically and immobilize the joint.

(2) If the ball have entered the joint, and remained loose in the cavity, without having caused apparent injury of the compact structures, the line of treatment will not differ materially from that of the preceding form of injury, except, perhaps, in the direct efforts to be made to accomplish the removal of the ball itself.

(3) If the ball have entered the joint, and be imbedded in the bone more or less completely, its location should be established (through a free incision of the soft parts) by means of the finger probe and the eye of the operator, or by the telephonic probe of Dr. Girdner, of New York, which will enable the surgeon to locate the missile readily without lacerating the surrounding tissues. The ball ought always to be removed if it be held loosely by the bone structure, or if it be situated so as to offer an impediment to the future movements of the joint. If it have passed into the bone to a point beyond the limit of the reflection of the synovial membrane, it would be better to remove it through a counter opening made from without (which can be readily drained externally), than to endeavor to remove it by way of the entrance. It may be better to permit a ball to remain in a bone, especially when it has not entered through the articular surface, than to remove it directly at the expense of increased injury to the articular cartilage and the bone structure of the joint. If the latter course be advisable, then dependent drainage of the joint will have increased importance, and should be maintained until the wound of the bone is healed. If a bullet that is permitted to remain, be followed by local disturbance, it should be removed at once—other things being equal—either directly, or indirectly by means of a counter-opening. In other respects the treatment of this injury is similar to that of the preceding ones.

(4) If a ball have passed through, or have remained in a joint, after having caused fracture of its bony structures, the detached fragments of bone should be removed, together with the ball, if it have remained. If a comparatively large fragment of bone be present, and be connected with the main shaft by healthy and uninjured soft tissues, it may be replaced and wired in its normal position. The antiseptic technic in these cases must be thorough in all respects. In fact, the wound should be treated as if it were a compound fracture of the joint.

(5) If a ball have penetrated a joint and have passed through the articular extremity of a bone without causing a fracture, all the bony spiculæ and detritus should be removed; dependent drainage established from the joint cavity, and in the course of the ball through the bone. However, this form of injury will be met with rarely, since the effects of the force of the ball on the bone will cause, almost invariably, a different result.

6. If a ball have entered a joint, and have caused more or less comminution of the bony structures, it has produced only the results which are the well-recognized effects of such missiles on adult bones. When the constitutional conditions of the patient,

and the circumstances surrounding him, will permit, an exploration of the joint should be made, through an incision of the soft parts, so planned that it will permit of either amputation, excision, or only removal of the loose fragment, to be practiced. Although, while neither amputation nor excision need be considered in the discussion of the treatment of these injuries, except it be in a general sense, still, it is proper, I believe, to remind the surgeon that he may be able, by the wise use of bone forceps, to remove bony asperities, and thereby place the osseous structures in suitable relations with each other to secure a useful limb, without assuming unwise risks, and this, too, without subjecting the patient to excision in the full meaning of the term. Yet, if an effort be made to save a limb by these conservative means, then, indeed, a full reliance must be placed on strict antisepsis.

7. If a ball have penetrated a joint, and at the same time have destroyed the vascular and nervous supply of the limb of which the joint forms a part, then, indeed, should amputation be performed. But if the nervous supply alone have been destroyed, union of the extremities of the divided nerves, with or without excision, should be practiced. If the arterial or venous trunks have been destroyed, and excision be necessary, then amputation should be performed, except when the collateral circulation will remain substantially unimpaired after the operation of excision.

The seven varieties of injury here specified are liable to numerous modifications, which, of course, may require a change of treatment in some important particular. The differences in the surroundings and in the physique of the patients, and the inability to carry into effect rational methods of practice, will call for the continuous exercise of a wise judgment on the part of the surgeon who esteems duty as greater than popular fictitious glory. He should ever remember that

> "Knowledge is the hill which few may hope to climb;
> Duty is the path that all may tread."

DEBATE.

Surgeon-Major LANGRIDGE, of the British Army, stated, that he had treated three cases of penetrating wounds of joints in the last few years. They were all of the same nature, viz.: small punctures caused by machinery. In two the elbow was affected, and in one the knee.

The same treatment was adopted in the three cases. The wounds and the surrounding skin were thoroughly washed with a strong antiseptic solution, a large antiseptic dressing was applied, and the joint was fixed and kept immovable. The dressings were not removed for some days. In all these cases recovery was complete, the motions of the joints being unimpaired.

As regards the treatment of penetrating wounds of joints, this depends on a variety of circumstances, and each case must be taken on its own merits: firstly, on the extent to which strict aseptic treatment can be carried out, and therefore would necessarily differ completely in civil and military practice; secondly, it would depend to a certain extent on the joint affected, for practice shows us that much greater liberties may be taken with some joints than with others—with the elbow for example, than with the knee.

A few months ago, at a civil hospital in London, I saw a case in which a bullet had penetrated the elbow joint and fractured the bones. The fragments were extracted, the joint was treated antiseptically, and the patient made an excellent recovery and had very fair movement in the joint.

Dr. VON FARKAS, Buda-Pesth, Hungary—There are two epochs in military surgery; the first, the period of Ambrose Paré; the second, that of Antiseptics. The

latter, applied to the treatment of gunshot wounds, has given the most brilliant results. The researches into punctured wounds of the knee joint are particularly enriched by the results reported by Prof. Bergmann in 1877. His method of non-interference has given a mortality of 6.6 per cent., against the statistics of Billroth and Czerny, which placed it at 83 per cent. My own statistics of the Servia-Bulgarian war, 1885, showed 19 cases of knee-joint wounds, without a fatal result; the majority arrived at our Lazaretto without inflammatory reaction—in those that had purulent synovitis, arthrotomy was performed. In only a single case amputation was performed—that on account of septic osteo-myelitis. On the whole, typical resections have no place in military surgery; opposed to which atypic intervention, in form of arthrotomy and "fragmentotomy" should be practiced, under strict antiseptic conditions, insuring free drainage of the secretions.

Dr. HENRY JANES, of Vermont, stated that in thirty-three instances during the late war, he attempted the conservative treatment of gunshot wounds of the knee joint, because the patients refused to submit to amputation; twenty-nine of the thirty-three died. He believes that traumatic inflammation of the bone does frequently occur without external wound.

Dr. C. W. BUVINGER, ex-Surgeon 80th Ohio Infantry, U. S. Volunteers, said:—

During our civil war two cases of penetrating injuries of the joints, though not of the knee joint, came under my immediate observation. The first was that of a gunshot wound of the ankle joint, which occurred in a strong, wiry Irishman, about five feet ten in height, at the battle of Corinth, Miss., October 4th, 1862. There was extensive comminution and laceration of the bones and tissues of the joint. Extensive swelling and inflammation of the foot and leg set in, followed in a short time by erysipelatous inflammations, with extensive formation of pus. Free incisions were made in the leg, and perhaps a quart of pus was evacuated. He was in a desperate condition, and I urgently importuned him to allow me to remove the limb, which I thought necessary to save his life. In a volume of profanity, both opulent and variegated, he swore that he would die first before he would consent to amputation of his leg. By removing the exfoliations, keeping the parts clean and at rest, and administering whisky, quinine and general tonics liberally, he made a perfect recovery, with only anchylosis of the joint.

The next case was that of a member of the 6th Kentucky Cavalry, at Resaca, Ga., in the summer of 1864. While cleaning his revolver it was accidentally discharged, the ball passing directly through the left elbow joint. His quarters being near to my own, I saw him in a few minutes thereafter. There was no comminution of the bones. I immediately removed him to the hospital, applied and constantly continued cold-water dressings, kept the parts immobile and at rest, and he made a perfect and complete recovery, without any other treatment whatever.

I mention these two cases because of their interest and marked contrast in their results with the cases which have already been mentioned.

Dr. R. B. BONTECOU, of Troy, N. Y., stated, that it had been his misfortune to see a great number of wounds of this class (misfortune because they, as a rule, turned out badly). During the late American war such cases, as a rule, were subjected to amputation; a few were resected; and some treated by liberal incision, rest and irrigation. He had personally operated by resection on three cases, one of which made a good recovery, with anchylosis in a favorable position. To illustrate the good effects of free incisions in such cases, he related the case of a young soldier in our late war, who received a gunshot wound of the knee and was captured by the enemy. The Confederate sur-

geon into whose hands he fell proceeded to perform resection, and had made a very long flap, with its base on the thigh, and had reflected the soft parts, when the operation was interrupted by our own men recapturing the wounded man, and one of our own surgeons replaced the soft parts, and he was sent to the rear and admitted to the hospital under Surgeon Bontecou's charge, and made a good recovery, as the result, probably, of the very free incisions, preventing the formation of pockets, or abscesses, which always follows suppuration of these articulations if not thus prevented. The foregoing relates to the days before antisepsis was practiced. Since his military experiences he has resected patellæ, opening the joint freely for that purpose, under antiseptic precautions, without suppuration.

Dr. MARSTON, of London, related his military experience. He cited cases in which a rifle ball had penetrated and passed through the knee joint without any apparent injury of the bony and other structures of the joint. In these cases antiseptic treatment and dressing, rendering the limb immobile, and subsequently very careful transportation, were employed, and the patients did well.

But in cases where the bony and cartilaginous structures of the joint are involved in the injury—and you cannot, by any examination on the field, always estimate the amount of the injury—it is certainly, as a general rule, and considering the great difficulties of transportation in warfare, ordinarily better, in the interests of the patient, to amputate the limb rather than attempt to conserve it or excise the joint. There may be exceptional cases, where the extent of the injury is limited and the attendant circumstances favorable, in which amputation should not be followed. The cases in warfare are quite different from the simple and operative injuries undertaken and seen in civil hospitals, just as the attendant circumstances are also so different under the two conditions. To some extent each case must be judged on its own merits, but still, as a general rule, amputation where the bony structures are injured by rifle-ball seems the best practice; that is, as far as our experience extends at present.

Dr. WILSON—I have been greatly interested in these papers on penetrating wounds of the joints. At the close of the War of the Rebellion, I was entirely satisfied, in all cases of gunshot wounds of the knee joint, to perform amputation, but the introduction of aseptic practice has caused me to change my views on this subject. I should not, at the present time, amputate a leg simply because the patient was suffering from a penetrating wound of the knee joint, in either civil or military practice. I should certainly, in the majority of these cases, depend largely on fixation and asepsis.

Prof. ELISHA H. GREGORY, of St. Louis, said, I am in perfect accord with the last two gentlemen who have taken their seats. I am astonished that amputation for gunshot of knee joint is so generally endorsed. Certainly life is not directly periled by injury of the extremities; the contingent inflammation is the danger. This, therefore, is the point upon which the discussion turns. Can we prevent inflammation? is the momentous question. The answer is yes. The answer accepted, the discussion ends. Amputation is out of the question. Traumatism never produces inflammation. Inflammation and infection are one. Surgery controls infection.

In reply to Dr. Reyburn, I would say: The series of events following injury are not inflammation—from my point of view they rather represent a physiological emergency. Why? Because the cell processes are in perfect order and in full force—simply intensified normal nutrition, with the addition, to be sure, of a neoplasm, which hastens to develop a new structure to restore the injured part. On the other hand, in inflammation, cell processes are disturbed, their forces abridged, and repara-

tion thwarted. There is no disturbing factor in traumatic reaction. Surgery predisposes to inflammation, does not determine it. Heat, pain, redness and swelling may not be inflammation. Carbolic acid may produce heat, pain, redness and swelling, but not inflammation.

Dr. E. A. Wood, of Pittsburgh, Pa.—While I concur with Dr. Gregory, that violence is not, but sepsis is, the cause of inflammation or death, I do not agree with him that amputation is never to be considered in relation to penetrating wounds of joints, and more especially of the knee joint. There exist three conditions when amputation will be the all-absorbing question: first, in penetrating wound of the knee joint, accompanied with severe and extensive injury of the leg and foot; second, where there is such injury to the soft parts around the knee as not only to cut off the main channel of circulation, but also to cut off all hope of collateral circulation; and third, where tetanus sets in.

Dr. Reyburn, of Washington, D. C., said—The statement made by Dr. Gregory, that inflammation is never caused by traumatic injury, is entirely too broad, and requires limitation.

In military surgery, wounds of the knee joint will often, from the unfavorable conditions under which the patients are placed, and their bad sanitary condition, result in active inflammation of the knee joint.

Dr. Lemoyne, of Pittsburgh, Pa., said—Mr. President, I believe that the proper rule for field practice in military surgery should be amputation of the thigh for penetrating gunshot wounds of the knee joint. The circumstances which render immobility absolutely impossible, doubtless contribute largely to this conclusion. I have a distinct remembrance of a case which was typical, as an illustration of this position. During one of the engagements of the Army of the Potomac, a gallant young corporal of the Sixteenth Pennsylvania Cavalry was wounded in the knee by a small missile, apparently from a pistol. Synovia appeared to be flowing from the wound, and there was no doubt in my mind that the joint was involved. This man was about 20 years of age, and one of the finest physical specimens of a man I have ever seen. He was informed that amputation of the thigh would furnish him the only reasonable prospect of saving his life. He absolutely declined to submit, stating that he would prefer death to the loss of the limb. The external wound was slightly enlarged, and the course of the wound examined by the finger as far as practicable, but without discovering any injury to the bone. Being influenced in a great measure by the patient's violent opposition to an operation, and considering this an unusually favorable subject for conservative practice, I consented to it. The transportation was short, and promptly secured.

Several weeks after this man's injury, I had an opportunity of visiting the hospital at City Point, Va., where I found him dying.

E. Griswold, M. D., of Sharon, Pa., said—I can concur, for the most part, in the opinions expressed by the gentlemen who have already spoken on the treatment of wounds of the joints. It has fallen to my lot—and quite likely others of this Section have had similar experience—to see cases of injury to the bones of the joint, and also, in two cases of the diaphysis (one of the femur and one of the tibia) in which blood poisoning, followed by death, occurred. In neither of the cases was there any external wound—no chance for the introduction of microbes. There was evidently septicæmia, but no pyæmia. The patients had diarrhœa, with fever, frequent pulse, rapid emaciation, and failure of the vital powers. Such cases, while they do not even weaken the opinion that the bad, sometimes fatal, results following the non-antiseptic treatment of wounds arises from the introduction of microbes—*do* lead us

to think that there must be some other agency than microbes, *unless* these can be generated at the seat of the injury, that causes death by septicæmia in cases where there is no external wound. There is no doubt a state of necrosis of the surrounding tissues in these rare but unfortunate cases, and absorption of the products—be they called prutrilege, ptomains, or something else—takes place.

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## NON-FATAL PENETRATING GUNSHOT WOUNDS OF THE ABDOMEN TREATED WITHOUT LAPAROTOMY.

### SUR LES BLESSURES PROVENANT DE COUPS DE FUSIL NON-FATALES PÉNÉTRANT L'ABDOMEN TRAITÉES SANS LAPARATOMIE.

### ÜBER UNGEFÄHRLICHE PENETRIRENDE SCHUSSWUNDEN IM UNTERLEIBE; BEHANDLUNG OHNE LAPAROTOMIE.

BY HENRY JANES, M. D.,

Formerly Surgeon U. S. Volunteers, Waterbury, Vt.

The tendency at the present day is, as I believe, altogether too much to reckless operations in the abdominal region. Laparotomy, with antiseptic precautions, can rarely be practicable in field military hospitals, especially after great battles. The following list of recoveries, *without* formal operation, in hospitals under my charge, from gunshot penetrating wounds of the abdomen and pelvic viscera, is furnished at the request of our President. The record is by no means complete, as, on account of want of time when breaking up or leaving, I was unable to take copies of the records of one general, and a number of large field hospitals.

Surgeons who have had much experience in the management of large military hospitals in the field, are well aware of the difficulty of keeping accurate descriptions of the wounds proving fatal during the first few days after great battles. Generally, the surgeon in charge has been suddenly assigned to a new position, with new details of assistants, often strangers to him, and untrained in their new duties. For the first two or three days everything is in confusion, while the wounded are being brought in by hundreds, and every surgeon is doing his utmost to get the amputations and other necessary operations finished before the inflammations set in. The records of the fatalities during this time, can generally be but little more than the names and regiments of the deceased, with the regions of the body wounded. Now, as a very large proportion of penetrating abdominal wounds prove fatal in two or three days, those histories which I have preserved in my note books are necessarily, in a measure, selected cases, and are, consequently, worthless for statistical purposes. I shall, therefore, only give short abstracts from the histories of the non-fatal cases.

In twenty-seven cases the abdominal cavity was penetrated, or its contained viscera wounded; and in ten cases in which the rectum or bladder were injured, the courses of the missiles were mainly in the pelvic cavity. Wounds of the pelvis, not implicating the intestines or bladder, are not reported in this paper.

In one small hospital, established close to a battlefield, I did, as I believe, keep in my private note book a record of every wound. The hospital was small, with about

175 patients, and, after the operations were done, I had no professional assistant. The histories of the early fatalities were necessarily written out mainly from memory, after the hurry and confusion incident to organization and operations were over, but they are believed to be substantially correct, and to account for every wound admitted. Five penetrating wounds of the abdomen, and one of the pelvis involving the bladder, were brought into this hospital; all proved fatal but one. The following is a brief abstract of the records of the fatal cases :—

CASE I.—An unknown man. A bullet entered behind, passed through the abdomen, and lodged under the skin in front. The man died the day after the injury.

CASE II.—A man, name unknown. A bullet passed through the abdomen, from behind forward. A large quantity of omentum protruded from the anterior wound, became strangulated, and was removed without pain or hemorrhage. Date of death not recorded, but probably two or three days after injury.

CASE III.—A. H., æt. 21. A bullet entered just to the right of the spine, wounding the liver, and lodging. Before death, which occurred on the fourth day, the patient became very much jaundiced.

CASE IV.—J. C., æt. 30. A minie bullet entered the right lumbar region. The patient apparently was doing well until the seventeenth day, when a slight hemorrhage occurred. The bleeding recurred occasionally for several days, when the discharge from the wound became colored with bile. For a number of days he spit bile freely. Death from exhaustion occurred on the twenty-eighth day.

CASE V.—C. J., æt. 22. A bullet entered at the nates on the left side, and passed forward into the pelvis, wounding the bladder. Urine flowed from the wound freely. The patient died, exhausted, on the fourteenth day.

The remaining and non-fatal case, Fisher, will be given, with wounds of the descending colon.

In none of the thirty-seven non-fatal cases hereafter described, was it certain that the small intestines were wounded, though in Case X, as the discharge was chyle-like at first, gradually becoming thinner until it ceased, it is possible that the small intestines were involved.

The viscera probably injured, judging from the position and course of the wounds and the character of the discharges, were: the cæcum or ascending colon, 5 times; the transverse colon, 3 times; the descending colon, 6 times; the rectum, 7 times; the liver, 3 times, once in connection with a thoracic wound, and once with a wound of the transverse colon; and the bladder, 3 times, once with a rectal wound, and once with a fracture of the femur.

Two cases of intestinal wounds are noted, without giving data sufficient to decide the point injured, and in nine wounds, penetrating the abdominal cavity, no note was made of intestinal injury.

The following are brief abstracts of the records of the five cases in which it was supposed the cæcum, or ascending colon, was injured :—

CASE I.—J. B. A., æt. 28. Wounded July 2d, 1863, by a minie bullet, which entered 3 inches above the antero-superior spine of the left ilium, and emerged 3″ to the right of the 4th lumbar vertebra. He was also wounded through both legs while crawling off the field on his hands and knees. The anterior wound had nearly healed at the time of his transfer to Baltimore, November 7th, 1863, but fecal discharges still continued from the posterior wound. In July, 1865, the artificial anus had closed. He was still alive and weighed 150 pounds in May, 1872.

CASE II.—G. W. S., æt. 18. Wounded July 2d, 1863, by a minie bullet, which entered 1″ below the ensiform cartilage, passed downward and outward through the ilium, and emerged on the right hip. Fæces passed through the exit wound for three weeks, but had ceased by the end of the fourth week. Several spiculæ of bone were

removed from the wound. By the 20th of September the entrance wound had healed, but that of exit was still suppurating. General health was good. On the 6th of October he was transferred to Baltimore, convalescent. November 12th, 1863, he was sent to City Point for exchange, in good condition.

CASE III.—G. B. B. Wounded May 3d, 1863, by a minie bullet, which entered 2½″ above the antero-superior spine of the right ilium, and emerged through the ilium 4″ to the right of the spine, wounding the cæcum in its course. Fæces discharged from the anterior wound for 20 months. 7½ years after injury the wounds were healed soundly. He was able to work steadily, and weighed 192 pounds.

CASE IV.—J., æt. 21. Wounded July 2d, 1863. A bullet entered the right lumbar region midway between the crest of the ilium and the 4th lumbar vertebra, passed upward and forward, lodging 2″ above, and a little to the right, of the antero-superior spine of the ilium. The track of the wound was about 8″. The bullet was removed on the sixteenth day. There were fecal discharges from the posterior wound until August 17th. On the 28th of September he was transferred to another hospital, cured. Nine years afterward he was drawing his pension.

CASE V.—I. S. B., æt. 23. Wounded July 3d, 1863, by a minie bullet, which entered the right iliac region two inches above Poupart's ligament, passed backward and emerged behind, near the crest of the right ilium, wounding the gut in its course. There were feculent discharges from the anterior wound as late as the 21st of October. His general health remained excellent. On the 9th of November he was transferred to Baltimore, and on the 2d of March, 1864, he was sent to Fort McHenry, well.

### WOUNDS OF THE TRANSVERSE COLON.

CASE VI.—T. M., æt. 18. Wounded July 3d, 1863, by a minie bullet, which entered three inches to the right of the umbilicus, passed through the abdominal cavity, and emerged three inches to the right of the spine, at the level of the junction of the second and third lumbar vertebræ. The transverse colon was probably wounded, and, perhaps, the liver also. There were discharges of yellow bile-like fluid at first, and of feculent matter from both wounds, for some time. August 5th the wounds were healing nicely, he had a good appetite, and his bowels were regular. By the middle of August he was feeling quite well, and was able to walk about the ward. September 7th the wounds had entirely closed, and he was transferred to another hospital, well. He was returned to duty February 9th, 1864, and has made no application for a pension.

CASE VII.—A. J. D., æt. 20. Wounded June 16th, 1863, by a minie bullet, which entered at the ensiform cartilage and lodged in the cavity of the abdomen. There was no shock or bleeding. Fourteen hours after injury, while the patient was defecating, he heard something hard fall into the vessel, which was found by the nurse to be the bullet. August 11th he was in good health and able to walk about the hospital. September 15th he was transferred, cured. Seven years afterward he was alive and well.

CASE VIII.—N. G., æt. 24. Wounded July 1st, 1863, by a minie bullet, which entered at the navel. He also had a sabre cut on the head. The lower extremities were paralyzed. There were fecal discharges from the wound, and there was great pain and difficulty in passing water. The wound had healed by the 1st of September, but he was still paraplegic, and the rectum was partially paralyzed. Fifteen days later he was transferred to another hospital, and on the 31st of October, 1863, he was discharged from the service.

### WOUNDS OF THE DESCENDING COLON.

CASE IX.—A. F., æt. 18. Wounded September 14th, 1862, by a minie bullet, which entered four inches to the right of the navel, passed backward through the abdomen, wounding the intestine, and emerged just to the left of the spine, fracturing the transverse processes of one of the lumbar vertebræ. Several fragments of bone came away,

and at first the fecal discharge from the posterior wound was free, but it gradually diminished and had nearly ceased by the 16th of November, when he was transferred to Frederick, Md., well nourished and apparently rapidly recovering.

CASE X.—T. W. C., æt. 28. Wounded July 3d, 1863, by a minie bullet, which entered three inches to the left of the navel, passed through the abdomen, and emerged one inch to the left of the first lumbar vertebra. The patient soon recovered from the shock, and walked to the field hospital. Fæces passed by the posterior wound for fifteen days. It is possible that the small intestine was wounded, as at first the discharge was milky or chyle-like. August 3d he was in good general health, and suffered no inconvenience from the wounds. September 2d he was transferred to another hospital, cured. May 1st, 1864, he was placed in the V. R. C. He died of phthisis in October, 1869. The artificial anus is said to have re-opened, for a time, after his discharge from the service.

CASE XI.—T. K. C., æt. 31. Wounded July 2d, 1863, by a minie bullet, which entered the left side nearly midway between the last rib and the crest of the ilium, wounded the descending colon, and passed out behind near the spine, just above the postero-superior spine of the ilium. Fecal discharges from both wounds continued until August 21st. They then ceased for a time, but, although he had natural passages daily, the wounds would occasionally open and give exit to fecal matter up to November 15th, when he was transferred to Baltimore. He was reported well April 23d, 1864.

CASE XII.—W. M., æt. 19. Wounded July 2d, 1863, by a minie bullet, which entered at the crest of the left ilium, six inches from the last lumbar vertebra, wounded the intestine, and lodged. The bullet could not be found. Another bullet caused a partial fracture of the left ulna, and a third wounded the right shoulder. His condition improved and his bowels moved regularly, but fecal discharges continued from the wound up to the time of his transfer to Ohio—November 17th. His general health was good at that time. He was discharged from the service in January, 1864.

CASE XIII.—J. N. P., æt. 34. Wounded April 2d, 1865, by a minie bullet, which entered just below the left nipple, between the tenth and eleventh ribs, passed downward and backward, and emerged two inches to the left of the spine, one inch above the crest of the ilium. There was no great shock, and he walked, without assistance, half a mile to the ambulance, which took him two and a half miles to the field hospital. The next day he was taken seventeen miles to the base hospital, where he remained a week. A considerable quantity of clothing was removed from the posterior wound during the first and second week after injury. On the thirteenth day feculent matter began to discharge from the posterior wound, and continued to do so for about three weeks. His appetite was fair most of the time. The posterior wound closed early in June, and the anterior about a month later. He was discharged from the service September 8th, 1865, in fair health, though somewhat troubled with constipation and variable appetite. He was alive in December, 1872.

CASE XIV.—E. P., æt. 24. Wounded July 2d, 1863, by a minie bullet, which entered three inches to the left of the first lumbar vertebra, and emerged one inch above the antero-superior spine of the left ilium. The gut was wounded. The artificial anus behind still remained open in April, 1867. He was alive in April, 1873, and had applied for an increase of pension. Probably the artificial anus still remained open, although the last report does not so state.

### WOUNDS OF THE RECTUM.

CASE XV.—F. E. H., æt. 23. Wounded July 1st, 1863, by a minie bullet, which entered the left groin and emerged one inch back of the right trochanter major, wounding the rectum in its course. The feculent discharge from the posterior wound ceased about the middle of September, and from the anterior wound about the first of October. The exit wound had healed by the 12th of October, and his general health was good,

but the entrance wound was still open. November 5th he was transferred to another hospital. For two years or more he occasionally passed wind by the wound. He was alive ten years after the injury.

CASE XVI.—W. H. A., æt. 22. Wounded July 2d by a minie bullet, which entered 2″ above and 1″ back of the right trochanter major, passed through the ilium across the pelvis, wounding the rectum, and emerged through the left ilium 2″ outside the left sacro-iliac symphysis. The entrance wound had healed by the last of October, but fæces still passed through the exit wound. He suffered very little pain, had a good appetite, and slept well. The wound was still discharging in February, 1864, and occasionally wind passed, as late as December, 1871.

CASE XVII.—W. S. B., æt. 18. Wounded July 2d, 1863, by a minie bullet, which entered the left groin ¾″ below Poupart's ligament, 2″ from the spine of the pubis, comminuting the horizontal ramus of the bone, passed through the lower part of the pelvis, wounded the rectum, and emerged through the greater sacro-sciatic notch. Fæces discharged from the posterior wound for some time, but they gradually ceased, and the wound had nearly healed by the 10th of October, but the anterior wound was still discharging healthy pus. His general health was good. He continued to improve up to November 10th, when he was transferred to another hospital, convalescent.

CASE XVIII.—J. W. B., æt. 18. Wounded July 3d by a minie bullet, which entered a little above the left hip joint, passed through the ilium, rectum and sacrum, emerging on the opposite side at a point a little higher than that of entrance. At first he had great pain in the back part of the pelvis, and micturition was difficult, but catheterization was not necessary. Suppuration was free. He had diarrhœa, but otherwise did well. By the 3d of September the wound had healed, he felt well and was able to walk about the ward. He was transferred to Baltimore October 6th, and was paroled November 12th, 1863.

CASE XIX.—J. L. F., æt. 35. Wounded July 3d, 1863, by a bullet, which entered the inside of the right buttock, and emerged through the left side of the scrotum. Fæces and urine escaped through both wounds, and fæces mixed with urine from the rectum. The urine had nearly ceased flowing from the wounds by the tenth day, but the fæces escaped longer. The suppuration was profuse, but the wounds healed rapidly, and by the 10th of August the excretions were voided by the natural channels entirely. He was transferred to Baltimore, convalescent, on the 6th of October, and was paroled November 12th, 1863.

CASE XX.—D. K. B., æt. 21. Wounded July 2d, 1863. A bullet entered the left groin, passed through the pelvis, wounding the rectum, and lodged in the right buttock, from whence it was excised the next day. There was considerable bleeding from the entrance wound, and fæces escaped from the posterior wound for about a week. By the 7th of August the wound had nearly healed, and the patient was out daily. He was transferred to Baltimore, September 16th, in good general health, but he still had some difficulty in flexing the thigh on the pelvis. He was paroled September 25th, 1863.

CASE XXI.—J. W. H. Wounded May 3d, 1863, by a bullet, which entered the upper part of the right thigh, and passed through the pelvis, wounding the rectum in its course. Fæces escaped from both wounds, and the lower limbs were paralyzed. By the 30th of August he was able to walk with a cane, had a good appetite, and slept well. He was discharged from the service December 31st, 1863. Ten years later he still had difficulty in retaining his urine and fæces.

CASE XXII.—R. N. Wounded May 3d, 1863. A minie bullet entered the pelvis, near the left hip joint, and passed through the rectum. The left leg was partially paralyzed and became considerably atrophied. He was alive in June, 1873.

WOUNDS OF THE LIVER.

The case of M. has been given among the wounds of the transverse colon.

CASE XXIII.—W. W. S., æt. 25. Wounded July 2d, 1863, by a minie bullet, which entered the right lumbar region, passed into the abdominal cavity, and emerged 4″ below and a little to the right of the navel. The right lobe of the liver was wounded, and fragments of the liver, and bile, were discharged from the wound. The wounds had healed by the 20th of August, but there was great pain in the region of the liver and transverse colon, which continued more or less for the next three weeks. September 25th he was transferred to Baltimore, cured. November 12th, 1863, he was sent to City Point for exchange.

CASE XXIV.—J. B. C., æt. 35. Wounded July 1st by a bullet, which entered the right side immediately over the tenth rib, midway between the spine and sternum, passed downward and backward, and lodged. The right arm and leg became paralyzed, and there was severe pain in the liver, right lung and right shoulder. There was bloody expectoration, and the patient became jaundiced in less than twenty-four hours. The cough was severe. He was improving August 12th, but the liver was still hard and swollen, and the lower lobe of the right lung was dull. September 2d he was transferred. In that month he twice expectorated bile in large quantities. In November he coughed up two small pieces of cloth. He was discharged from the service December 28th, 1863; was commissioned in the V. R. C. June 20th, 1864, and was discharged from the V. R. C. May 4th, 1868. He was alive in March, 1872.

WOUNDS OF THE BLADDER.

CASE XXV.—T. L., æt. 48. Wounded July 2d by a minie bullet, while in a kneeling position. The bullet entered the front of the left thigh, at the junction of the upper and middle thirds, passed backward, upward and inward, beneath the ramus of the pubis, and lodged in the pelvis. At first the patient suffered a great deal from dysuria. By the 14th of October the wound had closed, the general health was good, and there was no difficulty in urination, but he was unable to bear any weight on the left leg. He was transferred to another hospital November 5th, and discharged from the service January 18th, 1864. In February, 1866, he was operated on for strangulated hernia, and in April of the same year for stone in the bladder, when a large concretion, having the bullet for a nucleus, was removed. He has no pension record.

Case with wound of rectum and bladder has been given before.

CASE XXVI.—R. J., æt. 25. Wounded July 1st, 1863, by a minie bullet, which entered 3″ above the symphysis pubis, passed downward and outward, fracturing the upper third of the femur, and lodged in the outer part of the thigh. The wound had nearly healed by the 3d of September, but he passed something like semi-solid (phosphatic?) concretions from the urethra, and on the 20th of October a number of calculi, the largest about the size of a pea. On the 30th of October he was transferred to another hospital, apparently convalescent.

WOUNDS OF INTESTINES, BUT WITH PLACE OF INJURY NOT STATED.

CASE XXVII.—W. R. W. Wounded July 2d in the intestines, on the left side. The patient was transferred to another hospital August 4th, well.

CASE XXVIII.—J. H. W. Wounded July 2d and paroled September 28th.

PENETRATING WOUNDS OF THE ABDOMEN, NOT INVOLVING THE INTESTINES.

In the following ten cases, though the abdominal cavity was believed to be penetrated, no wounds of the intestines were discovered.

CASE XXIX.—F. N., æt. 19. Wounded July 1st by a minie bullet, which entered the right side of the thorax, fracturing the 7th rib at its middle, passed forward and

inward, and emerged in the median line 3″ above the navel. He was transferred to another hospital September 28th, well.

CASE XXX.—A. B., æt. 21. Wounded July 2d. A bullet entered on the left side, fracturing the antero-superior spine and crest of the ilium; passed backward and emerged behind, 4″ from the point of entrance. Transferred, cured, September 15th.

CASE XXXI.—N. F., æt. 24. Wounded July 3d, 1863, by a minie bullet, which entered at the middle of the crest of the left ilium, passed inward and lodged somewhere in the abdominal cavity. There was considerable pain in the left inguinal and hypogastric regions. On the 14th of September the parts were much swollen, and there was some fever, which subsided by the 19th; then there was gradual improvement until the time of his transfer, November 3d, when he was convalescent. January 10th, 1864, he was sent to City Point for exchange.

CASE XXXII.—W. T. J., æt. 25. Wounded July 2d by a minie bullet, which entered at the left groin and lodged in the abdomen. He improved steadily after admission until October 15th, when he was transferred to another hospital, convalescent. He was sent to Fort McHenry, well, January 29th, 1864.

CASE XXXIII.—J. B. B. Wounded July 2d by a minie bullet, which entered the abdomen on the left side. He was sent to City Point for exchange November 12th, 1863.

CASE XXXIV.—T. M. Wounded July 2d by a bullet, which entered the abdomen on the right side. He was returned to duty, with a ventral hernia, January 29th, 1864.

CASE XXXV.—L. M. Wounded July 1st by a bullet, which entered the abdomen on the left side. He was transferred to another hospital October 30th, doing well. His wounds were healing, but his knee was contracted, February 18th, 1864.

CASE XXXVI.—I. H. R. Wounded July 2d by a bullet, which entered the abdomen on the right side. Transferred, cured, October 9th, 1863.

CASE XXXVII.—J. I., æt. 33. Wounded July 2d, 1863, by a minie bullet, which entered 4″ to the right of the fourth lumbar vertebra, and lodged under the skin 3″ above the navel, from whence it was cut two days afterward. At first there was considerable pain and swelling of the bowels, vomiting, and dysuria. He also had intermittent fever, and pain in the shoulder, which lasted about two weeks. He was made ward-master in March, 1864, and was discharged from the service May 15th, 1865. He is not a pensioner.

In Case XIII it is quite probable that the gut was not opened primarily by the missile, but that the opening which first discharged fæces on the thirteenth day was caused entirely by the sloughing.

In five cases, viz.: II, VI, X, XIII, and XX, the artificial anus closed in the course of the first month.

In four cases: IV, VIII, XVIII, and XIX, in the second month; one case, XVII, in the third month; one case, XI, in the tenth month; one case, V, by the eleventh month; and two cases, I and III, in the second year.

In two cases, viz.: X and XV, the artificial ani, after having been closed for some time, reopened.

In four cases, viz.: VII, XV, XXI, and XXII, although the artificial ani had closed, the date of closure is not recorded.

In one case, XII, it might be inferred from the last report that the artificial anus had closed, although not so stated.

In two cases, viz.: XIV at four years, and XVI at eight years after injury, the last reports state that there were still occasional discharges of wind or fæces from the wounds.

In none of these cases were operations performed, except for the purpose of removing fragments of bone, the missiles, or foreign bodies.

The patients were kept as quiet as possible, and opiates were given freely if there was much pain or tendency to peritoneal inflammation.

# TREATMENT OF PENETRATING GUNSHOT WOUNDS OF THE ABDOMEN.

## DU TRAITEMENT DES BLESSURES PÉNÉTRANTES DE L'ABDOMEN.

## ÜBER DIE BEHANDLUNG PENETRIRENDER SCHUSSWUNDEN DES UNTERLEIBES.

BY THOMAS J. MOORE, M. D.,

Of Richmond, Va.

The reports of the medical and surgical departments of the French and English Governments, after the termination of the Crimean War, first attracted the attention of medical men throughout the world, as to the fatality attendant upon the treatment of Penetrating wounds of the abdomen.

The subsequent wars that have been waged by European governments, as well as the late great civil struggle in this country, have added but little, of an encouraging nature, to the literature upon this subject. The statistical reports offer nothing but the tabulated statement of deaths and recoveries, chiefly the former, under the conservative expectant plan of treatment. That this plan of treatment was to be much longer continued could hardly be expected. To Guthrie, Baudens and Legouest are we indebted for the first practical suggestions in the way of surgical interference in this class of cases. Yet their conceptions did not extend beyond the mere enlarging of the wound of exit or of entrance, for the purpose of repairing such injuries as were contiguous or easy of access. Abdominal Section (proper) was not dreamed of by them.

Dr. Walters, of Pennsylvania, was the first surgeon, on record, who performed abdominal section for internal abdominal injuries. He operated for ruptured bladder in 1862, his patient recovering. In the following year (1863) R. A. Kinloch, of Charleston, S. C., opened the belly, in order to repair internal abdominal injuries arising from a gunshot wound: the patient survived. A number of gentlemen, following in the wake of Guthrie, Baudens and Legouest, within the next few years enlarged and advanced their views, and in America we had McGuire in 1873 and 1881, Otis in 1876, Dugas in 1876, and Sims in 1882, all recommending laparotomy for the repair of certain internal abdominal injuries, especially those arising from gunshot wounds. The views of these gentlemen were published to the world with a strong degree of enthusiasm, and yet the majority of the profession at the present time adhere to conservatism.

The first successful operation, after those of Walters and Kinloch, was performed in 1883, by Kocher, of Berne; he entered the abdomen and sutured a pistol-shot wound of the anterior wall of the stomach; the patient recovered. The following year, W. T. Bull, of the United States, in a case of pistol-shot wound of the intestine met with a successful result. As the few cases that had been operated upon from 1863 to 1883 had uniformly died, the publication of these two successful cases gave a new impulse to this operation, and created a desire with the medical profession to put Laparotomy to the test in this restricted line.

The ovariotomists had already largely explored the field; all the minutiæ and details essential for opening and closing the abdomen had been worked out. They had demonstrated one capital fact: the danger involved in opening the abdomen for diagnostic purposes had been greatly exaggerated, the risks incurred being slight in the extreme in purely exploratory operations. With these data placed before them, surgeons became less chary about opening the abdomen, when deemed essential to the preservation of life. In consequence, quite a number of operations for gunshot and penetrating wounds have been performed in the past few years.

Dr. Thomas S. K. Morton, of Philadelphia, with great industry and much patience,

has collected all the cases that have been reported from 1862 to January 26th, 1887, throughout the world. He deserves the thanks of the profession at large for this invaluable statistical report. The number of cases reported is fifty-seven; of these 38 per cent. were for pistol or rifle-shot wounds, 35 per cent. for stabs, 17 per cent. for ruptured bladder, while 10 per cent. were for ruptured intestines.

Of these fifty-seven cases, there were twenty-two cases of penetrating gunshot wounds of the abdomen, operated upon by laparotomy; of these five recovered and seventeen died, a mortality of 77 per cent. Dr. Morton reports nineteen cases of stab wounds, with twelve recoveries and seven deaths, a mortality of 36 per cent. In ruptured bladder ten cases, four recoveries and six deaths, a mortality of 60 per cent. There were five cases of ruptured intestine, all dying after operation. The average death rate of all of these cases is 63 per cent., and if those of ruptured intestine be excluded, where all died from the severity of the injuries, we have whole number of cases operated upon as fifty-two, number of deaths thirty, average mortality 58.42 per cent. The records of the French army, after the Crimean War, show for penetrating wounds of the abdomen a mortality of 91.7 per cent. The English report an average of 92.5 per cent. The American statistics during the late war give us an average of 87.2 per cent. From the above statement we have a legitimate mortality of 58.42 per cent. where laparotomy and repair of internal lesions have been resorted to, against 87.2 per cent. where the expectant plan has been adopted. The saving of twenty-nine lives out of every hundred, that would necessarily be lost under the old plan, is eminently suggestive.* From the examination of the report of Dr. Morton, one finds in every case of death, where post-mortem was granted, the cause of death was both apparent and inevitable, and in no case could it be attributed to the operation. That we may look for more marked success in the future, we have every reason to hope; the operation is comparatively new; a proper knowledge of details has not as yet been acquired. Unfortunately for the profession, no one individual has operated sufficiently often to be considered an authority upon disputed points.

Drs. Bull and Dennis, of New York, have each operated five times, with the same results, two recoveries and three deaths. With the single exception of Kinloch, who has operated three times, no other operator has been reported as operating more than twice. These operators have been most painstaking and laborious in culling all essential points connected with their work, and giving them to the world. They have the satisfaction of feeling that the views they have labored to demonstrate as practical, have virtually been endorsed by the American Surgical Association, the New York State Medical Association, and the Philadelphia Academy of Surgery, together with many of the ablest surgeons both abroad and in this country.

I am aware of the fact that there have been statistics brought forward by some of our most distinguished surgeons, to prove that the conservative plan has produced as good results, if not better, than where surgical interference has been brought into play. Not having time to discuss the point in question, I will only state that, however alluring these statements might prove to those practicing in civil life, they can have but little bearing upon Army Surgeons. The character of the missiles used in war is larger, the firearm more powerful and destructive. A penetrating gunshot wound involving

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*Sir William MacCormac, in the annual oration before the Medical Society of London, May 2d, 1887, on "Abdominal Section for the Treatment of Intra-Peritoneal Injury," presents a number of tabulated reports in regard to this subject. Among others, one for gunshot wounds penetrating the abdominal cavity. There were thirty cases operated upon, seven recoveries, twenty-two ended fatally, one doubtful, an average mortality of 73⅓ per cent., an improvement of 3⅓ per cent. over the cases reported by Dr. Morton. It is but fair to the latter to state that Sir William incorporates all of Dr. Morton's reported cases in his tabulated statement.

intestines or other abdominal contents, will inflict infinitely more damage, in the way of contusion and laceration, than the small ball usually fired from the pistol of 22 or 32 calibre generally resorted to in civil life. To abdominal section are we to look for the rescue of a large percentage of lives, that would otherwise perish. Whenever, therefore, it is definitely ascertained that the abdomen has been entered by a ball, or other penetrating instrument, we are—unless there are some serious contra-indications—to enter the belly and endeavor to repair the damage inflicted. Much stress has been laid upon the rational signs that are believed to lead to a diagnosis. Shock has been declared the most constant one by the leading authors up to within the past four years; it has since been proved that it is by no means always present. In the report of Dr. Morton, previously referred to, we find marked, shock in twenty-four cases out of fifty-seven; slight shock in five; absent in four, while of the remaining twenty-four, report is silent. It is legitimate to infer that in the majority of the latter, shock was either entirely wanting, or so slight as not to be considered worthy of mention by the reporters of cases. When present it means injury, and nothing more. The examination of Dr. Morton's tables will not sustain the distinction heretofore drawn by some of our authors, that a ball penetrating the abdomen, and not involving any of the organs contained therein, will be unaccompanied with shock, while one penetrating the intestines or other organs is necessarily accompanied by great shock. In some of the most marked cases of extensive perforation of intestine there was absence of shock. Tympanites over the region of the liver is an inconstant, and, when present, an uncertain symptom. It may arise from distention of the transverse colon with flatus; it may arise where there exists contracted liver, with encroachment of intestine; it may arise from intestinal adhesion to the anterior wall of the abdomen in the region of the liver, with interposition of intestine over its free border. It can be, and is present in a certain proportion of cases where there exists intestinal perforation, attended with the escape of flatus into the abdominal cavity.

Emphysema of the abdominal wall is another uncertain sign; it can arise from simple entrance of air through the external wound. Often it is absent where intestinal perforation has occurred. Vomiting of blood is a sign of value; appearing just after injury, it indicates a wound of stomach, or the duodenum, or upper portion of the jejunum. It has appeared where there was contusion without penetration. The only definite sign, is the finding of the point of entrance of the missile or instrument into the abdominal cavity. The wound should be probed with some delicate instrument, avoiding entering the cavity; failing to reach a satisfactory conclusion, the track should be cut down upon, making an incision sufficiently free to determine the point in question. Where an entrance into the cavity is determined, laparotomy, for the furtherance of diagnosis, should at the earliest practical moment be resorted to. Where there is freedom from shock, the operation should be performed at once. Where shock exists, and, from the accompanying symptoms, it is believed the shock arises from, and is maintained by continuing hemorrhage, an immediate operation is imperative. When decided shock is present, a certain amount of reaction is necessary prior to undertaking the operation. Statistics clearly establish one point: the earlier the operation, the better the chances of recovery; the mortality is strikingly great whenever the operation has been delayed beyond twenty-four hours. It is highly important to endeavor to rally the patient from shock at the earliest possible moment, by applying heat as is usually directed; by the administration subcutaneously of morphia and atropia, combined in doses sufficiently large to produce a calmative effect upon the nervous system (usually small doses meet this indication); by the administration of stimulants, when necessary hypodermatically; but, above all, by the hypodermic administration of quinia. For several years past it has been well known to the profession that quinia, administered anticipatively, will prevent shock in capital opera-

tions. It will, in almost an equally efficacious manner, bring about reaction after the establishment of shock following an injury. I am surprised to see so valuable and important a factor relatively ignored; in our leading text-books it is merely mentioned, and that is all. For its proper administration, it should be prepared in as non-irritating a manner as is compatible with holding it in solution. There are several preparations recommended, all of them valuable, but none equal to the hydrobromate of quinia prepared as recommended by Professor Gubler. The following is his formula:—

℞. Quiniæ hydrobromate, gr. xlviij
Aquæ destillat., ℥ iv.
M. and dissolve, if necessary, by heat.
Sig.—Twenty minims contain four grains.

Three injections of twenty minims each will usually be required for the first administration, to be followed in the next twenty or thirty minutes by a corresponding amount. In administering, the needle should be carried up to its shoulder, confining it to the subcutaneous cellular tissue. The solution should then be forced drop by drop from the instrument as the needle is gradually withdrawn, the last drop escaping just prior to its exit from the skin. In this way suppurative inflammation is generally avoided, which has so often proved annoying to patients.

It is a matter of great surprise, to those who have not previously tried it, to find how efficacious this remedy is. It should invariably be used as an indispensable factor in establishing reaction from shock. I believe, if it was generally resorted to, it would be the means of saving many patients who would otherwise succumb. Where reaction has, to a certain extent, set in, the administration of an anæsthetic (preferably ether) will hasten it on, and in this way time will be gained for operating.

In the field, it is imperative to remove a patient from the line of first surgical relief, to that of the second, or field hospital, before attempting to operate. We have not reached the point where we can have at hand the instruments and appliances essential for operating at the immediate front, nor do I believe that it will ever be desirable; the proximity of the enemy, the din, bustle, confusion and excitement incident to battle, will all militate against immediate operation, both upon the patient and upon the operator. Hemorrhage, if present, should be controlled, the wound dressed antiseptically, and the patient sent to the rear.

The incision should always be made in the median line, and of sufficient length to permit of the free exploration of the abdomen and the examination of its contents. The temptation to incise in the line of the wound is great; but when we remember that the principal lesions may be on the opposite side of the abdomen from that of the point of entrance, that we will most probably encounter blood, and may have fecal extravasation, a central line becomes absolutely necessary. Systematically, and in regular order, the parts must be critically examined. Where hemorrhage is apparent, the bleeding point or points must be sought and secured. Inch by inch the alimentary track must be examined, commencing with the stomach, and proceeding downward in regular order. This is best accomplished by drawing the small intestines without the abdomen, and enveloping them in towels wrung out of hot water, which in some way has been disinfected, preferably with a three per cent. solution of boracic acid. The maintenance of the normal temperature of the bowel is important, as one of the means of warding off surgical shock. When the examination of the bowels has been completed, the remainder of the abdominal contents should be systematically gone over, until all lesions are discovered and arranged for repair. There is one thing to be kept uppermost in the mind: all manipulation within the abdomen is to a certain extent harmful, therefore search for the track of injury, and when certain that you have inspected all injured parts, desist from further investigation. There is another thing to be

remembered; the ball is not often found; it generally buries itself in some out of the way place, so it is well not to be too industrious in pursuit of it. Where the stomach or intestine is found perforated, the wounded margins (if necessary) must be trimmed, and the wound closed by means of Lembert sutures, placed about one-eighth of an inch apart; be careful to turn in the serous surfaces uniformly to the extent of one and a half to two lines, as the indications may require. The needles to be used in making these stitches are the ordinary small-sized sewing needles, with prepared silk of corresponding size. In making the Lembert stitch, the needle should be made to pass through the serous, muscular and sub-mucous fibrinous layer, being careful not to include the mucous membrane proper, in order that leakage may be avoided. The penetration of the sub-mucous membrane is deemed important, as it has been found to be the toughest and most resistant of the three membranes above referred to. Care should be taken not to tie the stitches too tight, for this is a frequent cause of gangrene. After the wounds have been closed they should be dusted over with iodoform. Where the small intestines have been perforated in several places in juxtaposition, it may become necessary to excise a portion of the intestine. The removal by Baum of 137 centimetres of intestine, from which the patient recovered only to die at the end of six months from progressive emaciation, shows there is a limit to exsection. Dr. Gunn reported a case of an insane woman, at the last meeting of the American Surgical Association, who, with a pair of scissors, cut into her belly, drew forth a portion of small intestine, and cut off eleven inches thereof; through surgical interference she made a good recovery. Surgeons at the present time do not think it is safe to cut off more than twelve inches of intestine in one section. When the perforations are so numerous as to require a more extended removal than this, in order to include the whole of the injured parts, it is deemed more prudent to resect in sections. When the operation is required, the injured intestine must be drawn out of the cavity, and placed upon a sponge or towel, in order to prevent the escape of fæces into the abdomen. Some one of the clamps at present in vogue, such as Rydygier's, Treve's, Tremain's (modified clothes-pin clamp), or others, can be used, but the hands of an assistant are generally to be preferred. In performing the operation, due attention must be given to securing proper arterial distribution at the terminal ends of the excised gut. To prevent kinking, a V-shaped portion of mesentery must be cut out, remembering to leave free margins of at least one-eighth of an inch, in order to aid in securing proper nutrition of the parts, and so soon as hemorrhage is arrested, the cut edges of the mesentery must be carefully united by means of interrupted sutures. At the mesenteric border the first stitches should be inserted, as this is the most difficult point to procure perfect coaptation of serous surfaces. As many as three sutures at this point are usually required; a fourth stitch should be placed directly opposite the insertion of the first; then two intermediate stitches between the first and fourth, to be followed by stitches placed at intervals of one-eighth of an inch apart, until the terminal ends of the intestine are brought into complete apposition, thus rendering leakage impossible. In bringing the serous surfaces together, one must see that they are regularly and evenly cuffed, about three lines being turned in, the tendency being to a gradual increase of the respective folds as the operation progresses. The Lembert sutures bring the serous surfaces in contact, adhesive inflammation sets in within a few hours, and in the end the stitches, and any cast-off portion of the bowel, pass into the lumen, and are expelled per anum. The treatment of the liver, spleen, bladder, etc., when wounded, must be conducted upon the principles, and by following the details, so carefully and accurately set forth by Nancrede and others, in their published articles. The wounding of the splenic or renal arteries will demand the removal of those organs; unfortunately, death usually takes place from hemorrhage before operative relief can be rendered. Wounding of one of the ureters will likewise demand extirpation of the kidney upon the affected

side. Should the mesentery or omentum be found wounded or contused, the injured section must be excised, and the parts carefully brought together with interrupted sutures; this is required to prevent the escape of blood into the abdominal cavity, or the throwing off of a slough; in this way we prevent spanæmia upon the one hand, or diffuse peritonitis on the other. In returning the abdominal contents great care should be taken that they are restored as nearly as possible to their original anatomical relations the one to the other. As adhesive inflammation is likely to take place, and agglutination to contiguous parts occur (for the time being), one can readily conceive how great danger might arise from malposition of parts.* The toilet of the peritoneum, during and at the completion of the operation, demands the utmost care, and the strictest observance of all essential details. The healthy peritoneum, as has been so interestingly shown by Wegner and Grawitz, is capable of disposing of a large quantity of foreign or noxious material. Serum, fæces, urine, bile, etc., are all capable of being absorbed by it. When, however, the peritoneum is injured from shot wound, the abdominal contents in a state of congestion from shock and injury—one or both—the state of affairs is anything but favorable for the removal of foreign materials, which, if permitted to remain in the cavity, will give rise to spanæmia or peritonitis. The establishment of either of these conditions will almost necessarily lead to a fatal termination. Clinical experience has taught us that, in order to avoid these dangers, absolute cleansing of the abdominal cavity of all foreign material is indispensable, prior to closing the same. The drainage tube should not be used when it can be avoided. The pouring out of a large quantity of any of the irritating materials previously referred to, the fear of recurrent hemorrhage, or the transudation of serum after closing up the abdominal cavity, should cause us to put in a tube for a few days, or until it becomes apparent that the original cause has been removed.

During the operation, if it becomes evident that the patient is passing into shock from any cause, the pouring of large quantities of sterilized water, elevated to a temperature of 100° to 110°, will prove of great service.

I have not deemed it necessary to go into the various details regarded as essential for carrying out the laws laid down for the procuring of perfect antisepsis, as they have been so thoroughly discussed in our text-books, nor, for a kindred reason, into the manipulative details for opening, closing and dressing the abdomen.

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* This has been fully demonstrated by Warren, of Boston, through experiments upon dogs, as set forth in a paper read by him before the American Surgical Association, at its last meeting, May, 1887.

# WHAT IS THE PROPER TREATMENT FOR PENETRATING WOUNDS OF THE ABDOMEN?

## QUEL EST LE TRAITEMENT PROPRE POUR LES BLESSURES PÉNÉTRANTES DE L'ABDOMEN?

## WAS IST DIE RICHTIGE BEHANDLUNG PENETRIRENDER WUNDEN DES UNTERLEIBES?

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The question of the proper treatment of penetrating wounds of the abdomen has been asked repeatedly—and was thought, no doubt, to have been answered—ever since the human body became the recipient of unnatural penetrating violence, and the fertile mind of man appreciated its dangers, and devised plans to obviate them. The early successes of ovariotomy, the general inculcation of the principles of antiseptic cleanliness, together with the renewed courage bred of the experience based on them, has opened the question again, and with a far better prospect of a final solution than ever before. The surgeon who ventures now into the peritoneal den of a Scylla, is not gulped up, as then, by an insatiable popular Charybdis.

For practical purposes, penetrating wounds of the abdominal cavity can be classified as the punctured, the incised, and the gunshot varieties. This classification has the merit of not only being a practical one, but it is also familiar to the most common tyro in surgery. Lacerated and contused wounds of the abdominal wall may take place, and communicate with the cavity itself, and these forms of injury may likewise be complicated with wounds of the abdominal viscera of a similar kind. However, the complications, and the indications for the treatment of the three former varieties, present such unanimity of kind and of method with the latter two forms of injury, that little else than this need be said of the latter, to complete the practical consideration of the subject. The complications of recent penetrating wounds of the abdomen are of a local and constitutional nature. The constitutional complication is shock of a greater or lesser severity. The shock may be caused either by the direct effects on the nervous system of the injury done by the missile, or be due to the loss of blood alone, and, frequently, to both of these influences combined. The loss of blood is thought to be the most active of the causes of shock.

The local complications are: hemorrhage, visceral involvement, presence of foreign bodies and septic influences introduced from without, the escape of visceral contents into the peritoneal cavity, and, not unfrequently, behind the peritoneum itself.

Frequently, a contiguous serous cavity may be penetrated by the vulnerating agent that inflicts the abdominal injuries, and cause independent local and constitutional symptoms of a grave character. The escape of the contents of a viscus into the peritoneal cavity is the most frequent and the most uniformly fatal complication of the series, notwithstanding the labors of Wegner and Grawitz, who have shown that the *normal* peritoneum can dispose of ordinary air, bile, or healthy urine without peritonitis, in the absence of putrescible influences, and also when these influences are present, if the amount of the extravasation be not so great as to overtax the conservatism of the peritoneum. It was shown that the presence of large numbers of microörganisms produced no evil effect, so long as the amount of the putrescible fluids could be disposed of by the peritoneum in a limited time. It was proved that fæces even, when mingled with putrescible albuminous substances, caused no peritonitis of the normal peritoneum, if the amounts introduced did not exceed that which the healthy membrane could get rid of, or encapsulate, within an hour. Since in a given case the amount and the nature of the extravasation cannot be determined, nor the nature of

the influences with which the extravasated fluids are associated, and since nearly 88 per cent. of penetrating wounds of the abdomen have died from the acute effects of the injuries, and principally of septic peritonitis, why do not these facts alone emphasize the urgency of more active measures, that the poisonous agents may be removed from the abdominal cavity, that the visceral wounds may be detected and repaired, and that free drainage may be established when required. The recognition of the complications of a case should always suggest at once, to the mind of the surgeon, the indications for treatment. However, the recognition of the complications of a case is ordinarily a matter of great difficulty, hence the occurrence of the doubts and fears that have so often tortured the minds of the most experienced surgeons, in connection with the proper treatment of these cases. The indications for treatment of recent penetrating wounds of the abdomen are substantially similar under all circumstances; still, the ability to meet these indications properly is controlled largely by the surroundings of the patient. It is plainly to be seen that the indications for the proper treatment of penetrating wounds of the abdomen should be met promptly and properly in large and well-equipped hospitals. It is also equally plain that in country towns and in out-of-the-way places, it will be much more difficult to meet these indications; not only on account of the inexperience of the local medical faculty in these matters, but also by reason of the greater inability to make adequate preparations for treatment within a reasonable time. These disadvantages, however, should not be regarded as insuperable or unmitigable, for, if thoughtful attention be given to this subject by the profession at large, this, combined with mitigating influences of purer air, and the better physique of patients, will compensate to a large degree for the advantages arising from a greater experience and a more ample preparation. On the fields of battle the indications will be met with greater difficulty still, owing to the greater demand for the services of the surgeons, and to the unfavorable surroundings of the patients themselves. On such occasions as these, the multitude of sufferers can receive but a hurried attention at first, while in civil life an isolated case can be treated at once with promptness and decision. It follows, therefore, that the proper treatment of penetrating wounds of the abdomen must depend on the exigencies of the occasion that call for it.

### INDICATIONS FOR TREATMENT, AND THE TREATMENT OF PENETRATING WOUNDS OF THE ABDOMEN.

The indications for early treatment may be divided briefly as follows:—

1. The arrest of hemorrhage, and the exclusion of septic influences from the wound.
2. The relief of shock; the careful removal of the patient to a suitable place for operation, and the necessary preparations for the same.
3. The prevention of inflammation and septicæmia.

The ability to arrest the hemorrhage will depend on its source. If the flow arises from the abdominal wall itself, it may be controlled, if severe, by the introduction into the opening of a plug of antiseptic gauze, over which an antiseptic compress can be firmly applied. However, the presence of these articles at this time requires that a previous anticipation of the emergency calling for them shall have been considered. The immediate application of antiseptic compresses to all fresh wounds received on the field of battle, together with the feasibility of instructing the soldiery of their importance, and the method of their application, is now receiving, abroad and in this country, the full consideration that its importance demands. If the aseptic material be not at hand, the plug or compress can be made of a handkerchief, or of other material of a similar character. In every case, however, all foreign bodies should be removed, and when possible, only aseptic materials should be employed to check the bleeding. If the flow be profuse, and the patient be thereby exposed to imminent danger before other means can be employed, a finger should be inserted into the wound at once, and

the bleeding point compressed between it and the thumb. If the wound be of sufficient size to enable one to catch the bleeding point, and to control it by mechanical means, then, indeed, this condition should have been anticipated and its need provided for. If the hemorrhage be taking place within the abdomen, it may be controlled, perhaps temporarily, by the firm application around the abdomen of uniform compression, aided by the restraint of the movements of the diaphragm by the same means, when this can be done without too great discomfort to the patient. It is proper to prepare, in this manner, all patients for removal who are suffering from penetrating wounds of the abdomen, except when the fecal extravasation is already escaping through the abdominal opening. In such cases the discharge should be facilitated rather than obstructed by an antiseptic compress even, except when the dangers to life from hemorrhage be deemed of greater import than the danger from fecal retention within the peritoneal cavity.

The shock should be cautiously treated on general principles, simultaneously with the removal of the patient to a suitable place for more active treatment. Fluids should not be administered per orem or per rectum, when the presumptive location of a perforation will expose the patient to the danger of their escape into the peritoneal cavity. Too great care cannot be employed in the removal of the patient to a suitable place for active treatment. The recumbent position should be enforced; the voluntary and involuntary efforts of the patient should be restrained by all practical means; careless and rough handling of the patient, or rolling him from side to side, should be forbidden; in fact, any act of the injured one, or of the attendants, which might increase the escape, and cause the diffusion of irritating matters into the peritoneal cavity should be eagerly prevented. The exploration of the abdominal wound should be done with strict antiseptic precautions, when possible. A wound of the abdominal wall may be probed, or explored with the finger sufficiently to determine if it has communicated with the abdominal cavity. The technic of the preparations, and of the operations for penetrating wounds of the abdominal cavity, have been fully considered already. He who is anxious to inform himself on these important points of the subject can do so if he wishes, through the current literature of the day. Certainly no one will be able to properly meet the demands of these cases if he have not availed himself of the benefits of the opportunities thus offered. It will be a difficult matter to carry out this technic in its amplitude on fields of action, by reason of the great disparity between the demands of the occasion and the means of meeting them. For the medical officers, on the battle field, to give the time and care to a penetrating wound of the abdomen, that is given in civil practice, would be but another example of the illogical act of "saving by the spigot and losing by the bung," since large numbers of patients, suffering from wounds of a less mortal nature, would be obliged to await the completion of a procedure which, at the best, would be followed by a disproportionately greater mortality.

Laparotomy for penetrating wounds of the abdomen cannot be practiced on the battle field with even ordinary care. It is a measure that is impracticable under these circumstances, as long as the greatest good to the greatest number is considered. Additional surgical aid would compensate somewhat, no doubt, for this state of affairs; but with this even, would not the excitement, the haste, and the uncertainties of the surroundings neutralize the results that are but just attained under the most favorable circumstances?

### PREVENTION OF INFLAMMATION AND SEPTICÆMIA.

The proper treatment for the prevention of these very common sequelæ of the penetrating violence, requires that the operation of laparotomy be performed to arrest the further escape of blood and of irritating matters from the viscera into the peritoneal cavity; to permit the removal of matters already extravasated; to allow of

the repair of the injured viscera, and to afford an opportunity for a thorough cleansing of the peritoneal cavity, and its drainage, when necessary.

Two forms of this operation should be recognized: (1) Explorative Laparotomy; (2) Laparotomy in its entirety. The former term is applied, as its name suggests, to the making of an explorative incision, through which the nature and extent of the intra-abdominal injuries can be established, and the feasibility of further procedure can be properly considered. The incision in this operation should be made at the seat of the abdominal wound; although it need be made only of sufficient size to permit of the determination of the following facts:—

(1) To establish the direction of the penetrating wound.

(2) To ascertain if the wound communicate with the abdominal cavity.

(3) To determine if blood or visceral contents be present in the abdominal cavity; also what viscus or vessels may be wounded.

If the wound be a punctured or an incised one, and the physical aspects of the agent that caused it to be, of such a character as to warrant the belief that the intra-abdominal injuries are limited to the immediate vicinity of the wound of the abdominal wall, it is altogether probable that the necessary examination and treatment can be carried into effect by the enlargement of the opening at this situation. I am of the opinion, however, that when such injuries as this have been attended with considerable hemorrhage, or by the extravasation of visceral contents, that the free incision in the median line offers the surgeon the best opportunity for a thorough examination, cleansing and draining of the peritoneal cavity. I believe that explorative incision should be employed as a diagnostic measure in all penetrating wounds of the abdominal cavity, irrespective of seemingly favorable symptoms which a case may present at the outset.

Laparotomy in its entirety, or laparotomy in the practical sense of the term, consists of not only opening the peritoneal cavity, but also of repairing the wounded viscera, and of cleansing and draining that cavity. It will be seen at once that the latter is by far the more important, more difficult, and more fatal measure of the two. The former, if done with preparation and care, need not expose the patient to unusual danger. The proper performance of laparotomy in its entirety, requires that the patient's condition and surroundings be suitable for it; that the surgeon be possessed of ample time, patience and operative skill, and also that strict antisepsis be at his command. It is unwise to practice this operation on a patient suffering with extreme shock, unless a continuing hemorrhage be the cause of the shock. Then the measure offers the only chance of saving life. An explorative laparotomy will determine the presence of this condition, and then the bleeding point must be sought for and secured at all hazards. The better the surroundings of the patient, the better will be the prognosis of the operation. If a patient can be readily and properly taken to a suitably conditioned hospital, it is better that this be done, than that the operation be practiced with unsuitable surroundings. However, the time to be employed, the distance to be traveled, and the means of transportation, together with the symptoms of the patient that call for immediate relief, should be carefully considered in estimating the advantages of the former course. The operating surgeon should have the necessary time to permit of a thorough and keen examination of the abdominal cavity and its viscera. The examination should be made methodically, and with care, to prevent the overlooking of a wound, or of an isolated collection of extravasated blood, fæces, etc. Severe hemorrhage should be controlled at once, even though it be with temporary means only. Before the closure of the abdominal cavity all oozing points must be secured, otherwise a severe hemorrhage may supplant the oozing, when the relaxing influences of intra-abdominal warmth is felt by the vessels, and lay the foundation of septicæmia or peritonitis. A wound of a hollow viscus must be carefully isolated with a flat sponge,

cleansed, and closed at once, otherwise it may escape the subsequent attention of the surgeon, or permit extravasation to take place. Wounds of the solid viscera will require active treatment also. If the liver have a superficial wound, it may be closed—with or without the application of the thermo-cautery—with dry catgut sutures, which will soon swell and fill the tracks made by the needles (Nancrede). The bleeding openings of the cut surfaces can be plugged with catgut—as in hemorrhage from bone—before the wound is closed. It may be necessary to tampon a wound of liver with antiseptic gauze in order to check hemorrhage and prolong the life of the patient. If the arterial supply of the pancreas be greatly impaired, this organ should be removed to prevent it from becoming gangrenous. A kidney and the spleen should be treated similarly, if extensively injured. It may be possible, however, to repair these organs in the same manner as is recommended for wounds of the liver. Contusions of serous surfaces should be excised and repaired ; sub-serous extravasations should be removed and the peritoneum repaired ; injuries of the omentum of a similar nature demand similar treatment.

In conclusion, I will respectfully submit the following propositions :—

(1) That the importance of antiseptic and aseptic means in abdominal surgery is well established at the present time.

(2) That ignorance of the method of their application, in these cases, on the part of the surgeon, is inexcusable at the present time.

(3) That a practical knowledge of the technic of abdominal surgery is now so well established and diffused, as to be within the comprehension and reach of every enterprising surgeon.

(4) That the percentage of recoveries from penetrating wounds of the abdomen is greater, when treated by the modern active plan, than that heretofore obtained by the expectant plan of treatment.

(5) That explorative laparotomy, as a diagnostic resource, is both a rational and acceptable measure under ordinary circumstances.

(6) That the ability to determine satisfactorily the existence of a visceral injury, its location and extent, and the amount of intra-peritoneal extravasation in penetrating wounds of the abdomen is impossible, except it can be done by explorative laparotomy.

(7) That laparotomy should not be deferred, when it is contemplated for the treatment of penetrating wounds of the abdomen, except when the advantages to be gained by deferring it are ample to compensate for the dangers of delay.

(8) That laparotomy is advisable for the purpose of arresting a severe and continuous intra-abdominal hemorrhage, when it is caused by a penetrating wound of the abdomen.

(9) That laparotomy is advisable for the purposes of the removal of the extravasated contents of an abdominal viscus into the peritoneal cavity, and, also, for the repair of the wound that permitted the escape.

(10) That the amount of blood, or of extravasated visceral contents that may remain in the peritoneal cavity, with safety to the patient, either with or without the presence of putrescible agents, is not known.

(11) That the median incision is the preferable one, when the extent of the injuries inflicted, and the degree and nature of the extravasation into the peritoneal cavity cannot be fully comprehended and treated by enlargement of the explorative incision, made in the course of the penetrating wound.

## DEBATE.

Thomas G. Morton, M. D., Surgeon of the Pennsylvania Hospital, Philadelphia, said : The first point to be considered in a given case of abdominal wound is to make the

diagnosis of *perforation*. If unequivocal signs of peritoneal involvement are present, then this point is settled. If such signs be absent, as is often the case, then, when the patient is gotten into such condition that an operation is justifiable, perforation or non-perforation should be proved by enlarging the existing opening, and noting whether the peritoneal cavity is in communication with the wound.

Cases in which the ball comes from behind forward, but does not pass through the anterior abdominal parietes, will demand the surgeon's best judgment in many instances. In such instances there may be special cases where an expectant treatment might be justifiable. But this variety of intra-peritoneal injury, without definite sign of such traumatism, will be of rare occurrence; and with the elaboration of definite signs of intestinal and other similar injuries, even more rare.

If perforation be proved to have taken place, then, I think, it becomes the surgeon's duty to operate, and to do so as soon as the patient's condition will allow or justify such a procedure.

A good physical condition cannot be expected, in a large number of cases, where the shock, etc., are caused by hemorrhages, extravasation, etc. Judgment and experience must be most relied upon by the surgeon in deciding as to the proper time for an operation, and each case must be a law unto itself.

Much, however, depends upon the promptness shown in undertaking this operation, as well as upon the patient's condition. The time for the operation should be the very earliest moment consistent with the patient's condition and surroundings. The latter should be the most aseptic available, but even for these, long transportation should not be made, in any but very exceptional cases. Aseptic precautions, in the very broadest sense of the term, should be employed before, during, and after the section, in order to insure success.

As regards the line of incision in the abdominal walls, I prefer the median for almost all cases—practically all. It should be of sufficient length to permit free inspection of the abdominal contents. No harm will ensue from a properly treated parietal incision, no matter how long it is. Points of great hemorrhage or extravasation should receive the surgeon's first attention upon gaining admission into the peritoneal contents, after which there should be made a most careful and systematic examination of all the contained or adjacent organs and viscera.

The utmost care will be required, in many cases, to find some injuries, particularly those involving the colon, along the omental attachments. In this search there should be included (by gentle manipulation) the intestinal canal, from the œsophagus to the rectum, the liver, spleen, pancreas, kidneys, bladder, etc. Injuries must be appropriately repaired as found. A second careful investigation of much-injured localities will, once in a while, bring to light an overlooked wound.

All damages having been repaired, copious irrigation of the abdominal cavities should be employed, if there has been any hemorrhage or extravasation of intestinal or vesical contents.

To this end, the entire peritoneal contents should be deluged with hot (100°–110°) distilled water, or 1–10,000 sublimate solution. It may be introduced best by a Tait's irrigation tube and trocar; by a clean vaginal syringe, or by simply pouring the liquid from a pitcher. Even where extravasation, etc., have not taken place, this irrigation will greatly benefit the patient and overcome shock—hastening reaction. The irrigation should always be continued until the fluid returns from the abdominal cavity perfectly clear, and clots cease to float out. Then the entire abdomen should be sponged dry, and sutures introduced to close the external wound. A great majority

of gunshot belly wounds require drainage. The tube is not sufficiently often used, in my opinion.

Almost all extravasation cases are safer with than without the drainage tube. The drainage tubes which I use are made of glass, and are placed either in the pelvic basin or at the seat of a large or multiple lesion. Upon the introduction and subsequent care of this drainage tube will depend very much of the result. I think that certainly an attempt should be made to deal with these conditions in military surgery, and most so in those cases which are brought to permanent, or even temporary field hospitals. Doubtless their proper treatment under such adverse circumstances will frequently be impossible, yet some surely can be so treated, and it should be the intent of all military surgeons to provide themselves with the necessary materials for such work, and to treat as many of these otherwise fatal injuries as are within the range of their utmost power and ingenuity. Without this intent none can feel that they have done their whole duty.

Can we not venture to hope that, before such intrepid men as are usually to be found in our military service, the apparently insuperable obstacles to abdominal surgery close to the field of battle will be over, at least in part, and hereafter more and more swept away? All credit awaits the attempts of those who will first lead in a trial which, under the most unfavorable circumstances, can do no harm, and, on the other hand, can bring vast benefit, and save life otherwise likely to be lost.

Prof. Henry H. Smith, resigning the chair to Surgeon Joseph R. Smith, U. S. Army, said:—

I wish to supplement the excellent remarks of Dr. Morton, by alluding to the rapid progress of surgical knowledge on the subject of The Treatment of Penetrating Wounds of the Abdomen. Only eighteen months since, I presented to the Surgical Section of the American Medical Association a paper on this subject, in which was stated the importance—in view of the responsibility of the operation—of deciding what was the proper course to pursue, and what would be shown by evidence to be the correct decision. The Section was therefore urged to collect facts on the result. Now, these facts are rapidly accumulating. Dr. Morton has reported the wonderfully favorable results of laparotomy, stating that in his experience he would now never hesitate to perform it in every case where the cavity of the abdomen was undoubtedly opened, and he would anticipate that the patient's chances of life would be augmented by the operation. On the other hand, the paper of Dr. Janes reports numerous cases that recovered without laparotomy. The surgeon's duty at present is to hold the scales of science perfectly level, place the facts of each side on the opposite scale, and see which outweighs the other. From the wonderful cures accomplished in the hospitals of Philadelphia and New York, the benefits of the operation appear to far outweigh the old expectant and sedative plan; but the question must ever yet be regarded as *sub judice*, especially when resorted to on the field. From the recent advances of science, it is quite possible that in a few months we shall be furnished with a satisfactory technic adapted to cases in the field.

Surgeon Edwin Bently, U. S. Army, stationed at Little Rock, Ark., and representing the Arkansas State Medical Society, said:—

Mr. President—It is not my purpose to make an extensive disquisition on the subject of the paper read by Dr. Moore, of Richmond, but for the purpose of maintaining a few of his positions taken on the fitness of opening the abdomen on the

battle field. As a practical surgeon, who on more than one occasion has exposed the peritoneum, I cannot regard laparotomy as a fit operation on the battle field, especially on the first relief, where the requirements for making a neat peritoneal toilet are not at hand; and to the neglect of others around, whose lives might be saved by ligation of bleeding vessels of limbs; for ligatures could be applied to *several* femoral, or other large vessels, while *one* laparotomy could be done. Valuable as is this new process of exploring the abdominal cavity, it is and must be an operation which, to be done well, must be done with care. The evidence of wounds of viscera is not always clear. Shock cannot be regarded as a positive sign of wounded viscera, since the severest form of shock may be found where a penetrating wound does not exist, and it would not be proper to perform laparotomy during shock. To neglect wounds, where the necessity of an operation is clear and demanded to save life, is in my opinion unjustifiable. We could better defer the operation of laparotomy for the second relief station, where all the necessary means may be at hand, so as not to increase the mortality of this great and valuable operation from lack of means and accommodations, for this serous membrane is as sensitive to irritation now as in the days of our fathers.

Dr. WILLIAM VARIAN, of Pennsylvania, believed that it will be possible, in many cases, in the military surgery of the future, to perform laparotomy for penetrating wounds of the abdomen in the field hospitals, upon the field of battle. The necessity and safety of laparotomy in these cases has been already decided—at least in the minds of those skilled and experienced in its details.

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## THE CAUSES AND TREATMENT OF ERYSIPELAS.

### CAUSES ET TRAITEMENT DE L'ÉRÉSIPÈLE.

### DIE URSACHEN UND BEHANDLUNG DER ROSE.

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These two subjects have been considered together since the earliest periods of medical history. Hippocrates recorded a careful account of Erysipelas. Celsus described a local condition that followed wounds of the skin, attended with symptoms that harmonize with the phenomena now presented by this disease. Galen, too, described it accurately, and also recommended a method of treatment for it. The term "Erysipelas" is familiar alike to the laity and to the medical profession of all enlightened countries. The laity attach to the word the same dread significance that childhood attaches to darkness and to supra-natural associations. To the medical profession at the present, as in the past, the occurrence of this disease in any of its separate independent forms, or of its protein combinations, gives rise at once to interrogative speculations bearing on its causation, course and termination. Speculations of a similar nature—although often incited by different circumstances than these—are a part of the text of almost innumerable special treatises, and of all general works on medicine and surgery. By preference, the questions asked to-day are: What are the

important recognized causes of this disease; and, what new or old method of treatment is best intended, both practically and scientifically, to prevent its occurrence and to combat its existence? By common consent—a consent born of necessity, it is true—the leading observers of the present time define Erysipelas as an acute infectious and contagious disease, characterized by certain special symptoms of both a local and general nature.

The want of a more definite knowledge of the disease compels the adoption of a descriptive definition. Perhaps, at some future time, this disease may be christened for the name of the special microörganism upon which it has been found to depend for an existence. Erysipelas has been considered to be allied with the exanthemata, by some observers. The greater number of these, however, have opposed this view because of the following facts: First, its contagiousness is not as demonstrable in each case as with the exanthemata; second, no established period of incubation precedes its first manifestations; third, repeated attacks occur in the same individual; fourth, the length of its course is less precisely defined; fifth, its different epidemics are broad-spread and rapid in development, as if due to some general cause, rather than dependent on the influence of a local cause, acting on the unprotected; sixth, its local manifestations often precede the constitutional phenomena; seventh, its complications and sequelæ are not of so common occurrence, nor of such a severe character, as with the exanthemata.

The second, third and sixth of these differences are the antitheses of the comparative manifestations of the exanthemata. It is claimed by some, that repeated attacks of this disease even increase the liability to subsequent invasions by it in the same individual. The remaining differences are of a much less pointed significance. In fact, the existence of unusual forms of either of these diseases, cannot be satisfactorily determined at once, because of the elasticity of the expressions employed to indicate their differences.

### CAUSES OF ERYSIPELAS.

The causes of this disease may be divided into the predisposing and exciting causes. The exciting cause is the special virus itself—a poison that is thought by some to depend for its activity on a definite and independent microörganism. The predisposing causes are those that are found to be associated with the development and propagation of the disease. Among the predisposing causes that are possessed of a traditional significance may be mentioned the age, sex and occupation of the patient; season of the year, meteorological and telluric conditions. The influences of these causes in the production of erysipelas have been estimated frequently, and with varying results. In fact, it seems to be almost a waste of time to give to them any other than a cursory consideration, since the degree of acquired or inherent vulnerability of persons, appears to exercise a far greater influence on the existence of erysipelas than that due to the isolated facts of age, sex, occupation, etc., etc. It will not be amiss, however, I believe, to report—as is quite often done in each newly-written article on this subject—the statistics of a before-unmentioned source. One hundred and seventy-one cases of this disease were found by Dr. Seymour Houghton, house surgeon of the Bellevue Hospital, N. Y., to have been recorded in the history books of this hospital between January 1st, 1877, and January 1st, 1887. It appears that a great majority of these cases were developed outside of the hospital; still, the histories of the cases do not state this fact with sufficient clearness to enable one to draw practical conclusions bearing on this aspect of the question.

The influence of age and sex, in 163 of these cases, appears to have been as follows: 1 case under 5 years, female; 4 cases between 5 and 15 years, of which 75 per cent. were males; 32 cases between 15 and 25 years, of which 62½ per cent. were males; 82 cases between the ages of 25 and 45, of which 80 per cent. were males; 34 cases between 45 and 65 years, of which 82½ per cent. were males; 7 cases between 65 and

85 years, of which about 71½ per cent. were males; 4 cases are reported in which the age is not stated, 66 per cent. of which were males. Of the 163 cases, 123, or 75 per cent., occurred in the male sex, which is contrary to the common statement that the female is more often attacked by this disease than the male. The fact that the disease appears to have been associated more often with the male sex in Bellevue Hospital, can be accounted for by reason of the greatef number of the admissions of this sex, who suffered from the effects of traumatism. The English reports, however, favor the belief of the greater frequency of this disease in the male sex. The vital statistics of New York city show that 155 persons die annually from so-called idiopathic erysipelas. Of this number about 63 per cent. are of the male sex, which corresponds closely to the percentage of fatal cases in England between the years 1862 and 1868 (56 per cent.).

The relation the disease bears to the age of the patient in these cases is similar to that which has been shown heretofore from other sources. The period of the greatest physical activity, with its attendant exposure to disease and violence, marks the epoch of the greatest prevalence of erysipelas. Violence destroys or weakens the barriers that intercept the entrance of the poison to the system. Some forms of disease also exercise a similar influence and, in addition thereto, impair the vital forces so that the vulnerability of the general organism is increased. The influence of the time of year on these cases was: December, 12 cases; January, 14 cases; February, 16 cases; March, 36 cases; April, 14 cases; May, 21 cases; June, 15 cases; July, 8 cases; August, 11 cases; September, 3 cases; October, 9 cases; November, 6 cases. Eighty-seven of the total number occurred during the months of February, March, April and May, while but 16, or a trifle over 9¾ per cent., happened during the autumn months. According to Haller's analysis of the records of the general hospital at Vienna, the majority of the cases occurred in the months of April, May, October and November. The relation of temperature and ventilation seems to exert quite a direct influence in the development and propagation of erysipelas. As the cold increases, the vital forces of the poorer classes are diminished, the bodily vigor lessened, and the vulnerability increased by the privations incident to diminished nourishment, and uncleanliness. As the temperature becomes lowered, the admission of fresh air to the habitations is lessened by the occupants, to shut out the cold and economize the natural and artificial warmth that may be present. The evil increases with the extent and vigor of the cold weather, until finally it reaches its maximum at late winter or early spring. This condition of things finds a natural remedy, however, in the influence of the fresh air and the milder temperature on the deleterious agents and customs that have bred its existence and fostered its development. In the 163 cases, the predisposing causes are considered from a twofold standpoint, viz.: those causes having a general or constitutional bearing, and those having a local or special bearing. The general causes include syphilis, rheumatism, debility and alcoholism, of which alcoholism is far more common than all of the others taken together. The local causes are limited to those of a surgical nature entirely, and include all of the local effects of violence. There does not appear to be anything in the records of these cases to indicate that the immediate surroundings of the patients were factors in the development of the disease. Sixty-nine of these cases, which is over 42 per cent. of the entire number, can be attributed to violence alone. Thirty-three of the entire number—over 20 per cent.—seemed to depend on constitutional and local causes conjointly, the latter being of a traumatic nature in every instance. The constitutional cause was recorded as "alcoholism" in all but three of the cases. It appears, consequently, that 102 of the entire number had an appreciable local injury, by way of which the elements of the disease could have gained entrance to the body. Forty, or 24½ per cent., had no cause assigned for the disease. The important part played by the immoderate use of alcohol is especially emphasized by this showing. It appears that the excessive use of this drug, exercises both a direct and indirect influence

on the human system, preparing, as it were, a highly nutritious culture-medium for the reception and development of the special organism of erysipelas. It is both interesting and instructive, to study the predilection which this disease appears to possess for different parts of the body. The lower extremities were attacked in 60 of the cases, 44 of which were males, and 16 females. This showing can be satisfactorily accounted for on the basis, that the lower extremities are more often affected with local diseases, the results of impeded circulation in them, and are also more apt to suffer from exposure and from injuries, than are the upper extremities, in the class of patients from which these statistics are deduced. The sex of the persons attacked seems to exercise no influence on the election of the seat of the disease, since the relative proportions of the sex, in each site affected, bears a substantial practical relation to the proportion of the sexes to each other in the entire number of cases. The upper extremities were attacked in 45 instances; of this number 36 were males and 9 were females. This proportion seems natural, too, because the hands are exposed to manifold irritations and injuries, by reason of their prehensile and protecting functions. Next in point of frequency comes the face, with 41 cases, of which 29 were male and 12 female patients. The exposed state of the face at all times, and the liability to the receipt of direct violence, add much to the frequency of the attacks in this situation. The muco-cutaneous borders of the face, with their frequent excoriations, from various causes, add their productive influences as well. The fact of the abundance of hair follicles and sebaceous ducts that are present on this part of the body should be given a respectful consideration, since they may form ready ports of entry for the special germs of the disease. The scalp alone was attacked in but three instances, all of which were male patients. The trunk was attacked singly in but three instances; a fact which emphasizes at once the importance of the protecting influences of the clothes, absence of injuries of it, and absence of the anatomical peculiarities that exist in other and more exposed parts of the body. In eleven instances, the disease is reported to have attacked different portions of the body at the same time, as the face and leg in one instance; arm and leg in two instances; scalp and thigh in one instance; scalp and face in two instances, etc. The last two instances, however, need not have been due to separate attacks, but to extension of the disease alone. No practical conclusions bearing on occupation can be based on any deductions from these cases. These cases all occurred in the poorer classes; those who are obliged to labor for all they honestly obtain, and who find the earnings barely sufficient to give meagre support in health, and who seek, therefore, the hospital confines when ill. Meteorological influences, especially when characterized by sudden changes in the temperature and humidity, are thought to increase the prevalence. However, this influence is of too problematic a nature to be possessed of any practical significance whatever. Telluric influences are, according to Naumann, of some importance in the causation of erysipelas. He considers that it occurs more frequently on sandy and stony soils. This view is likewise of such a doubtful nature, as to be fitly associated with that relating to meteorological influences. It is no doubt true that the saturation, or pollution of soil situated beneath habitations, or adjacent to them, exercises a favorable influence on the propagation, if not in the production, of this disease. However, these points could be given no bearing in any of the 163 cases just cited. Habits of life, especially the bad habits, exert a strong indirect influence in its production. The persons who are addicted to the inordinate and continuous use of spirituous liquors are, thereby, more exposed to harm, and they acquire physiques that are unfit to combat the effects of the ills and injuries that are the common sequelæ of their unfortunate habits. As already shown, the influence of the alcoholic habit is forcibly seen in connection with the Bellevue Hospital record. Diseases attended with general anasarca, or with Bright's or cardiac disease, etc., etc., seem to prepare the integument—of the lower extremities especially—to kindly accept and carefully cherish the special

poison of erysipelas. Typhus and typhoid fevers, too, are companionable with this disease in a small degree. The frequent and even unsuspected existence of excoriations of the muco-cutaneous orifices, are a fertile site for the inception of erysipelas. Traumatisms, old and recent, together with idiopathic ulcerative processes, afford a ready entrance to the body of the special poison. Imperfect ventilation of the rooms in which the sick of this disease had been confined, also defects in plumbing, especially when close to the bed of the patient affected with an injury, or ill of a debilitating disease, predispose strongly to attacks of erysipelas. The somewhat frequently quoted example narrated by Volkmann, of the Middlesex Hospital, is a pertinent illustration of the great importance of these influences. It happened, in this instance, that the different patients who were placed in two beds, situated next to each other, were attacked constantly by erysipelas, which limited itself to these patients entirely, although many others were in the ward. An examination of the plumbing disclosed the fact that the defective soil pipe of a water closet, in use, passed in the wall directly between the two beds. The defects were remedied and the disease disappeared at once. After an interval of ten years, an experience entirely similar to this, in all respects, repeated itself in the same situation at this hospital. Other examples of an identical nature are likewise reported. The blood-soiled linen of operations has proved the direct source of attacks of erysipelas. However, examples like the preceding are not sufficiently numerous, as yet, to enable one to draw other than indefinite conclusions of the kind of influence that is exercised by them. Hospital influences, both direct and indirect, are active agencies in the propagation of erysipelas. There is no proof, however, that the isolated fact of crowding together has more than a general influence in the development of this disease, even if many of the persons be suffering from suppurating or non-suppurating wounds. Erysipelas develops rarely in prisons, in transport ships, or in crowded military hospitals. The un-acclimated of the pest house may not suffer from it, while the common attendants of the well-appointed hospital, that is guarded from its approach with decision and care, may suffer severely from its inroads. These facts seem to indicate that the indirect hospital influences are of little importance, except when the exciting cause itself is extant. When the disease is present in a hospital, it commonly extends from bed to bed in the order of the position of patients with each other, owing, no doubt, to the direct influence of the existing disease, or the surroundings of the unaffected patients. Erysipelas is propagated directly by handling, sponging, dressing, and other methods of contact of the surgeon and attendants, with both the diseased and healthy patients of a ward. The cast-off clothing of the diseased, and the bodies of those dead of erysipelas, may secure its transmission. It appears from the foregoing illustrations, that a large number of the cases of erysipelas arise from contagion, and from direct inoculation. There are a few isolated instances reported where persons, who could not have had, apparently, the least association with each other, or with another suffering with the disease, have developed it. These instances appear to indicate that in isolated cases the disease may have a spontaneous and indigenous origin. The following example, from the observations of Trousseau, is considered a typical illustration of this mode of development. An epidemic of this disease affected, simultaneously, nearly every occupant of a private house, even attacking the gate keeper of the house himself. Another instance, related by Dandé, is as follows: At the end of November, 1886, a merchant in Paris was attacked with facial erysipelas, and was cared for by his wife and maid servant. The cook, who did not enter the sick room, was attacked eight days after by the same form of the disease. On the same day two operatives, who had no association with the patient, were attacked also. In all, twenty-one persons were attacked consecutively, of whom eighteen were of the female sex. At the same time, numerous other cases occurred in the city and its environs. While it is true that these instances seem to indicate a spontaneous origin of the disease, yet it is

equally true that each of the cases may have been caused in some unappreciable manner by influences which are entirely in accordance with our limited knowledge of the mode of the development of this disease, in the majority of instances. Examples can be recalled which seemed to indicate the spontaneous development of smallpox, and of the other eruptive fevers; but in these, after a thorough search, some intercommunications of ventilation, or some defect of plumbing, could be accepted as the rational interpretation of the unseemly developments. Moreover, if this disease were of spontaneous origin, even in isolated instances, this fact alone, when taken in connection with the well-proven contagiousness of it, should give rise to a very much larger number of cases than now exists; their relation with each other would be more marked, and the spread would be more of the character of an epidemic than it now is. From the preceding facts it appears:—

(1) That age, sex and occupation exercise, of themselves alone, no important influence in the development and propagation of Erysipelas.

(2) That any predispositions to this disease that may appear to be based on the age, sex and occupation of persons, are the results rather of the associations incident to them than to either of these facts alone.

(3) That season of the year is a predisposing cause of some significance; important, however, in direct proportion with the hardships, privations and unhygienic conditions which it imposes on the people.

(4) That the habits of life, and the special diseases that deteriorate the vital powers, increase thereby the vulnerability of the tissues to the special poison of erysipelas.

(5) That meteorological and telluric influences do not exercise a special influence in its development or propagation.

(6) That wounds of all varieties, ages and conditions, which involve loss or impairment of the cuticle, are important local predisposing causes of erysipelas.

(7) That diseases also, that are attended by similar integumentary conditions, are strong local predisposing causes.

(8) That defective plumbing appears to exercise a particularly active local influence in the causation of erysipelas, in isolated cases.

(9) That hospital influences indirectly increase the vulnerability of the tissues; directly they propagate the disease by incautious associations of the *fomites* with the wounded surfaces of the patients.

(10) That, while the isolated occurrence of cases indicates the occasional spontaneous origin of the disease, still, they are too few in number and too imperfectly reported to be entitled to any other than a respectful consideration.

The most important question bearing on the causation of this disease at the present time is, whether or not it possesses a special exciting cause in the form of a special poison, the active element of which can be determined, and be found susceptible of reproduction by a system of germ culture. The old theories that referred its causation to biliousness, indigestion, closure of the pores of the skin, etc., etc., are entitled to only the respectful consideration that one gives to persons and ideas, by the aid of which greater things have been accomplished. Suffice it to say, in this connection, that, until the time of Trousseau, these views were accepted pretty generally by the profession. To him, however, appears to have belonged the credit of having given a more logical line of thought to the consideration of this disease. This distinguished physician regarded erysipelas as a local disease, its visible manifestations depending on a specific noxious influence acting from without, at first locally, and secondarily infecting the entire organism. Reasoning from this standpoint, Trousseau made no direct causal distinction between the idiopathic and traumatic varieties of erysipelas. He believed the essential poison to be similar in both varieties, and that in every instance this poison gained a foothold through some defect of the cutaneous or mucous surface. According to the observations

of Volkmann, all forms of wounds may serve as a starting point of this disease. It matters not whether they are old or recent, severe or trivial, premeditated or accidental, suppurating or non-suppurating; whether they are cuts, fissures or abrasions; whether they are cuticular or mucous; still, each variety can form a lodgment for the special poison—a nidus for its extended development. Hebra, Kaposi and others assumed this disease to be due to the absorption of secondary chemical products of the local inflammation. Rosler inclines to a miasmatic cause. Numerous other eminent pathologists claim it to be of a contagious nature. Cohnheim took the happy medium, and claimed for it a miasmo-contagious nature. Various observers have experimented with the fluid products of erysipelas. They have introduced them into the skin of men and animals, but without uniformly definite or harmonious results. Max Wolf, Stark, Hiller and Geber obtained negative results; Ponfick, Belieu, Zuelzer, Tillmanns and others obtained partial or indefinite results; Orth and Lukumsky succeeded in producing genuine erysipelas from injection of the putrid fluids. The fact of the existence of a special pathological coccus of this disease is maintained by Orth. Billroth, Ehrlich and Tillmanns were not able to discover a special microörganism in all cases, and the last observer does not think its existence to be essential for the production of the disease. More recently Koch, and later still Fehleisen, Ziegler and others have adopted the germ view of the disease, and located its active site in the lymphatics and connective tissue of the skin. With the view of adding to the general fund of knowledge relating to the special agent of erysipelas, or at least of confirming something of that which had been already presented, Dr. Herman M. Biggs of the Canegie Laboratory of Bellevue Hospital, New York, was requested to begin a series of observations of this disease, which, at my suggestion, were to embody a consideration of the following questions:—

1. Has erysipelas a distinctive organism?

2. What are its characteristics? (*a*) Where found; (*b*) how cultivated; (*c*) distinguishing features; (*d*) infective power, on (I) cutaneous surfaces; (II) serous surfaces; (III) mucous surfaces?

3. Is the virulence of the poison invariable? Has inoculation a protective influence? Are the fluids of the organism, or the organism itself, or both together, essential to infection?

Dr. Biggs complied with my request, and employed for the purpose all the time that he could well bestow upon it, in the intervals of other and more exacting duties. The results will be expressed in his own language:—

"The following series of experimental investigations were undertaken at the request of Dr. Bryant, with a view to the solution of certain questions regarding the etiology of erysipelas. The experiments were conducted quite independently of the thorough and careful observations that have been previously made upon this subject, and the conclusions arrived at are based upon the results obtained in them. The careful observations of Fehleisen, Passet, Rosenbach, Ziegler and others are quite familiar to all conversant with the recent literature of this disease. The first question to be answered is, 'Has erysipelas a distinctive organism?'

"This question must be answered by the demonstration of an organism in the inflamed skin, by its isolation and cultivation in suitable nutrient media outside of the human body, and the inoculation of susceptible animals, or human beings, with pure cultures of this germ and the production of the characteristic symptoms of the disease. These conditions have all been entirely satisfied. In the portions of inflamed skin and subcutaneous tissue excised from patients suffering from erysipelas, there is found in the lymphatic spaces and vessels a peculiar organism—a Coccus—which tends to arrange itself in longer or shorter chains. If small portions of skin are removed from the edge of the advancing inflammation with sterilized instruments, after a careful disinfection of the surface, and are introduced into liquefied gelatine, at the end of forty-eight or

seventy-two hours there will be found numerous small white points where the skin comes in contact with the medium. These points, on microscopical examination, are found to be composed of small cocci arranged in chains, similar in appearance to those found in the diseased tissue. The chains vary in length, and may be straight, curved or in peculiar spiral or S-form. In five cases of erysipelas, affecting the face and back, arm, thigh, and foot respectively, such cultures were obtained, and the same germ was found in each case. Further, when the ears of rabbits were inoculated by hypodermic injection, with small amounts of either liquefied gelatine cultures, or cultures suspended in distilled water, there was produced, at the end of forty-eight hours, a diffuse redness, extending over the whole ear, accompanied by swelling, thickening, œdema, and dilatation of the vessels. In fifteen experiments where such inoculations were made, this result was obtained. Pure cultures of the organism were again obtained from the rabbit's ears in several cases, and the chains of cocci can here again be easily demonstrated in the distended lymphatics of the diseased tissue. Thus the chain of evidence is completed. An organism is found in the inflamed tissue in erysipelas; this is isolated, and cultivated outside the living body; is used for inoculation of rabbits, and an inflammation is produced, having the usual characteristics of erysipelas. The organism is again found in this diseased tissue, and again obtained in pure culture from it. The question, then, may be answered in the affirmative, that erysipelas has a distinctive organism.

"The second question is, 'What are the characteristics of this germ?' *i.e.*, (*a*) Where found; (*b*) how cultivated; (*c*) general and distinguishing features; (*d*) infective power, on (I) cutaneous surfaces; (II) mucous surfaces; (III) serous surfaces?

"(*a*) The *organism* is found in the lymph vessels and lymph spaces of the skin and subcutaneous tissue in the inflamed area. Here it is present in large numbers and arranged in chains. It is found in the peri-vascular tissue, but not in the blood vessels. It is apparently present in largest numbers just on the border of the advancing inflammation, but is also found in the earlier affected areas. Not infrequently cultures of the germ can be obtained from the serum of erysipelatous blebs; but usually it is not easy to demonstrate microscopically the presence of the germ in them by the examination of the ordinary cover-glass preparation made from the serum.

"(*b*) *Pure cultures* were obtained from patients suffering from erysipelas in the following manner: The skin was first washed thoroughly with a solution of bichloride of mercury, and then alcohol, the latter being allowed to evaporate. Small pieces were then snipped out with sterilized instruments just at the border of the advancing inflammation, and were introduced into culture tubes of sterilized gelatine. The gelatine should be either liquid at the time of inoculation, or should be liquefied after inoculation, and kept in a fluid condition for about twenty-four hours, in order to bring the tissue in intimate contact with the medium. A properly prepared beef broth may be used in place of gelatine, for obtaining the original cultures. This has a certain advantage as a culture medium, as the growth in this is much more rapid than in a solid medium. The organism can be cultivated at the ordinary temperature of the room, but grows somewhat more rapidly at a slightly increased temperature. The cultures can also be obtained in some cases from the serum of blebs, and from the older portions of the inflamed skin. In the gelatine tubes, inoculated as described above, after about forty-eight to seventy-two hours, there are found small white points where the particles of skin come in contact with the medium. These, on microscopical examination, are shown to be made up of small cocci arranged in chains. Other cultures can be made from these points in the usual manner. It is necessary for the successful cultivation of this organism that the medium should be neutral or very slightly alkaline. If the medium be acid, or a little too alkaline, the growth is prevented or greatly restricted.

"(*c*) *General and distinguishing features.* This germ occurs in the form of small round cells, which show a tendency to an arrangement in longer or shorter chains, and hence is called a *Streptococcus.* These chains may be made up of two, four, or eight or more members, and may be straight, curved, or in a peculiar S-form. The size of the cocci is from .3–.5 mm., but not infrequently there are found in these chains (and this is especially true of the old cultures), cells much larger than this. These larger cells sometimes become separated from the chains, divide, and form large diplococci. The organism shows the same tendency to arrange itself in chains in both the lymph spaces and vessels of the inflamed tissue, and in cultures. In gelatine-plate cultures, the streptococcus grows in the form of small, white, point-like colonies, which spread out very slightly upon the surface. No liquefaction of the gelatine is produced. Microscopically, these colonies appear early as small, round, yellowish, slightly granular specks, with a regular contour. Later, the color becomes darker, and the contour is broken here and there by little offsets from the principal growth. In gelatine-tube cultures, around the inoculation point upon the surface, in forty-eight hours, is found a very delicate, almost transparent growth, about one or two mm. wide. The line of inoculation appears as a delicate, white, somewhat broken line, with small, round, dense, white, point-like colonies closely surrounding it. These colonies never attain a size larger than a small pin's head, and growth ceases at the end of a week. In fluid media the coccus produces a light flocculent sediment, without causing cloudiness or odor of the gelatine. Upon the surface of agar-agar the growth is not abundant, and appears as a delicate semi-transparent layer, thickest along the line of inoculation, and showing here and there upon its surface small elevations. The growth upon potatoes is very slight. In all the media the development comes after five to eight days, and is never very abundant. As regards the duration of life in cultures, it is sometimes difficult to obtain transfers after even ten days, but after liquefying gelatine cultures, I have succeeded in obtaining a growth even after three months.

"Since the discovery of the streptococcus of erysipelas, numerous other streptococci have been described, as that of suppuration, diphtheria, scarlatina, etc. It is not possible to distinguish with certainty, either by microscopical examination, or by culture test, between some of these, and this is especially true of the streptococcus of erysipelas and that of suppuration. The distinction can only be made by inoculation experiments, and I incline to the belief that these two germs are identical, and have been only somewhat modified by their conditions of life or their environments.

"(*d*) *Infective power* (I) *on cutaneous surfaces.* In experiments where the ears of rabbits were inoculated by hypodermic injection of cultures of the germ, the following pretty constant symptoms were obtained: At the end of twenty-four hours there was a circumscribed redness, the size of a quarter of a dollar, surrounding the point of inoculation, with enlargement of the vessels extending from this point to the root of the ear. In forty-eight hours this redness had become diffused, and involved the whole ear, which often hung helplessly by the side of the head. Beside this there was increased temperature, thickening, swelling and œdema, with marked dilatation of the vessels of the ear. The animal appeared sick, was slow in its movements, breathed more rapidly than normal, and showed an increase in bodily temperature of from 1° to 3° F. The rapidity of the development and the severity of the inflammation varied in different cases, depending upon the amount of virus used for the inoculation, and apparently, also, upon its virulence, and the susceptibility of the animal. In some cases the symptoms were considerably later in development, and were much less marked. The effects produced by virus obtained from different sources, varied in the severity of the symptoms produced, and varied in a pretty constant manner. When the quantity of virus used was very small, often only a circumscribed redness, with dilatation of the vessels, was produced, which disappeared after four or five days. On

the other hand, when a larger quantity was employed, as one-quarter or one-sixth of a Pravaz syringeful, the symptoms produced were very severe, and in many cases resulted in death on the third or fourth day. At the autopsy in these cases, but slight lesions were found, aside from the local manifestation in the ears. The bladder was very much distended with cloudy urine, and the kidneys were somewhat congested. The other organs were apparently normal. In the earlier experiments, no examinations of the blood after death were made by the culture test, but in later ones, culture tubes were inoculated from the blood of the left auricle, and in almost every instance a pure culture of the streptococcus was obtained. Dried and stained cover-glass preparations of the blood, however, did not disclose the presence of any characteristic chains. This was, perhaps, due to the small number of organisms present in it. Individual cocci were found, but there was nothing characteristic in their appearance. From the cultures thus obtained from the heart's blood, other rabbits were inoculated, and the characteristic symptoms of erysipelas were produced, resulting in death in some cases; and pure cultures of the germ were again obtained from the blood of the left auricle. These cultures were employed for the inoculation of a *third* series of rabbits, with the same result. There seemed to be an increase in the virulence of the virus brought about by these successive inoculations, and the symptoms apparently came on earlier and were more severe. The comparatively small number of experiments made in this manner, however, would not justify any positive conclusions on this point. In the large majority of cases there was no suppuration following the inoculation, but in three instances there was a small collection of pus at the point of inoculation, which, in two cases, microscopically showed the presence of the streptococcus, mingled with other germs. Only occasionally were the inoculations followed by slight, or no symptoms, and in these cases the amount of virus used was exceedingly small. In a few experiments the animals died after six or eight days, even when the inoculation had been followed by very slightly-marked local lesions. No examination of the blood was made in these cases, but I think it would have shown the presence of the streptococcus.

"(*d*) *Infective power* (II) *on serous surfaces*. In a number of experiments rabbits were inoculated by the direct injection of fluid containing the organism, into the abdomen. In these cases, of course, it was impossible to say where the fluid passed, for it might have been introduced into the intestines, or it may have found its way, in part, or altogether, into the abdominal cavity. Some of the rabbits used in the experiments recovered, and some died. At the autopsies of those that died nothing could be found to account for death. The bladder was distended, as in the other cases of death, but there were no signs of peritonitis. Unfortunately, the blood was not examined in these cases. In another series of cases, an abdominal section was performed by Dr. Bryant or myself, and the injection was made directly into the peritoneal cavity. The wound was then closed. Strict antiseptic precautions were observed throughout the operations. Three rabbits and one dog were operated upon in this way. The dog recovered, without showing marked symptoms at any time following the operation. Two rabbits died early, and one on the sixth day. The first rabbit, on the day following the operation, had a temperature of 104½° F., and was evidently very sick. The following day the temperature was lower, and the animal gradually improved, but was found dead on the sixth day. The usual changes were found at the autopsy. One of the other rabbits that died showed at the autopsy a slight grade of adhesive peritonitis. There was very slight fibrinous exudation. The wound was not in a healthy condition, and the inflammation, I believe, was due to septic influences other than that from the streptococcus. In the third rabbit there were no signs of any peritoneal inflammation, but a gelatine tube inoculated from the blood of the left auricle, showed an abundant and pure growth of streptococci on the second day. This culture was afterward used for inoculation of another rabbit and produced the ordinary symptoms of erysipelas there.

"(*d*) *Infective power* (III) *on mucous surfaces.* Eight rabbits were inoculated, as superficially as possible, underneath the mucous membrane of the upper lip, to determine whether an inflammation of the mucous membrane could be produced. In every experiment, after the lapse of twenty-four hours, there was slight swelling of the lip. In forty-eight hours this had greatly increased, and had become excessive in a few cases, but there was no material affection of the mucous membrane itself, as it never showed more than slight hyperæmia. In more than half the cases where a considerable quantity of the virus was used, death resulted at the end of the third or fourth day. At the autopsy the lip was found to be three- or fourfold thickened, and showed the presence of a dense phlegmonous inflammation, with a thick, hard, fibrinous exudation into the tissue. In only one case was there any pus, and this contained other organisms mingled with the streptococci, as was shown by microscopical examination. This rabbit, however, died on the fourth day, and from the blood of the left auricle a *pure* culture of the streptococcus was again obtained. In a second case, also, the streptococcus was obtained from the heart's blood after death, following inoculation in the submucous tissue. When recovery took place, the swelling slowly diminished, but had not entirely disappeared at the end of ten days. In all of these cases there was some elevation of body temperature, varying from 1° to 2½° F.

"The third question is, Is the virulence of the poison invariable? Has inoculation a protective influence? Are the fluids of the organism, or the organism itself, or both together, essential to infection?

"First, as regards the virulence of the virus. There was certainly a very great difference in the effects produced by the virus derived from different cases. In the experiments, where virus from one source was used, death very rarely followed the inoculation, while in that having a different source, death was the more frequent result. But in both these series, the local symptoms were practically the same, there being only a difference in the intensity. An attempt was made to determine whether one attack of erysipelas granted any immunity from a second attack. To decide this question, in some of the animals that had recovered from the first attack of erysipelas, a second inoculation was made, but there seemed to be no constant protective influence exerted by the first attack. The cause of death, in all the cases where it occurred, I am satisfied was due to *general infection.* The earlier cases were not examined with this idea in view, but in every one of the cases of death in the later experiments, whether the inoculation was made in the ear, subcutaneously, or in the submucous tissue, or in the peritoneal cavity, or whether a local disturbance was produced or not, where inoculations were made from the blood after death, cultures of the streptococci were obtained. These cultures were again used for inoculation, and produced, in each case, the usual symptoms of erysipelas, and, in one or two cases where death occurred after these second inoculations, pure cultures were again obtained from the heart blood. In only three cases in all the experiments was suppuration produced, and in each of these it was but very slight, and in two of them several forms of germs were found in the pus. In one case, following inoculation in the ear, a small collection of pus was found, which gave a pure culture of streptococcus. As regards the relative virulence of the virus to age of the cultures, it was found that very old cultures (two or three months old), were much less virulent than more recent cultures, and the transfers from these were also less virulent. Whether the fluids or the organism be the essential agents of infection can be easily answered. The characteristic erysipelatous inflammations were produced by inoculation with cultures from the first to the ninth generation. It is apparent that, after so many transfers, any material that might have been originally introduced into the culture fluid, that did not have the power of reproduction, would have become infinitesimal. Again, a culture of the streptococcus was sterilized, and two Pravaz syringefuls of the medium were then introduced in the submucous tissue

of a rabbit's back without producing any result, showing that it was the life contained in the culture which produced the disease.

"We may conclude, then, that—

"1. Erysipelas has a distinctive organism.

"2. This organism is a streptococcus, and is found especially in the lymph vessels and lymph spaces of the inflamed skin and subcutaneous tissue.

"3. It can be cultivated outside the human body, in any of the ordinary transparent nutrient media, and when these cultures are used for inoculation in rabbits' ears, an inflammation of the skin is produced, which shows all of the characteristics of erysipelas as it occurs in the human being.

"4. When inoculations are made in the subcutaneous tissue, a phlegmonous inflammation is produced without formation of pus, and without any material involvement of the mucous membrane.

"5. Introduction into the peritoneal cavity of moderate amounts of the virus produces ordinarily no inflammation of the peritoneum, but may be followed by death resulting from the passage of the coccus into the general circulation.

"6. When death follows inoculation either of the cutaneous, mucous, or peritoneal surfaces, it is brought about by general infection, and pure cultures of the germ may be obtained from the blood of the heart.

"7. One attack of erysipelas affords no protection against a second attack.

"8. The virulence of the virus from different cases of erysipelas varies, and the severity of the symptoms produced by inoculation depend upon the degree of virulence, and the quantity of the virus employed.

"9. The virulence of the virus may be attenuated, by leaving cultures without transfers to fresh media for considerable periods of time."

### TREATMENT OF ERYSIPELAS.

The treatment of erysipelas, and in fact of all diseases, should include the preventive and curative methods. The preventive treatment relates to combating, in every possible way, the influences of all the predisposing causes of erysipelas. The influences exercised by age, sex, season of the year, and even occupation, are not important, and are, for the most part, unavoidable. Meteorological and telluric influences are of a more tangible nature than these. It matters not whether the associations be of a military or a civil character, the extremes of meteorological influences should be avoided at all times, when possible. If they cannot be avoided, then their unfavorable influences should be lessened in every possible manner. Unfavorable telluric influences, too, may be present under forced circumstances, but proper attention to drainage, to the personal habits of individuals, and to proper surroundings, will reduce the unsanitary influences of these conditions to a minimum. In civil life but little can be done in this respect, except, perhaps, by those who devote their time, money, and personal efforts to philanthropic work. In those amenable to rigid discipline, better and more direct results can be obtained. The medical officers then can exercise a strong moral influence for good, which, when supplemented with the disciplinary efforts of a commanding officer, will be productive of the most beneficial results. The association of erysipelas with pyæmia, typhus fever, and with diseases that cause general anasarca, is recognized to be of a slight degree. However, the knowledge of an occasional association should admonish us to be attentive to all influences bearing on the hygiene of erysipelas. All local evidences of traumatism that embrace a solution of the continuity of the soft parts, also local diseased action attended by similar evidences, should be treated with antiseptic protective measures, especially if erysipelas be apprehended. Bad ventilation and plumbing demand urgent and immediate attention. The instance already cited of the influence of the emanations of a defective soil pipe on the patients adjacent

to it, gives great emphasis to the latter fact. Hospital influences, and the influences incident to overcrowding, strongly predispose to the propagation of erysipelas from bed to bed, either by means of actual contact of the poison with the injured portion of the body, through the agency of *fomites*, or by aerial transmission. There can be no doubt of the fact that vigorous and well-directed sanitation, attended with isolation, will exercise a far greater influence in limiting the development and spread of this disease than can be had by the most scientific plans of medication alone. The curative treatment may be both of a general and local nature. The former is directed to the constitution of the patient, and includes the employment of tonics, etc. It is thought by many that the tincture of the chloride of iron possesses especial virtues for the treatment of this disease. While it is not possible to point to any number of instances that can be accepted as incontrovertible proof of this fact, still, an agent of treatment that is adopted as generally as this one is, must possess some practical merit, at least. The application of turpentine, with or without carbolic acid ; boric acid in solution or mixture ; the injection of carbolic acid solutions, and solutions of other recognized remedies of this nature, into and around the diseased areas, have, in some instances, appeared to exercise a curative influence. The application of cold to the diseased part, by the means of ice bags, cold compresses, and the like, diminishes the local temperature, lessens the burning sensations, and also appears to have a curative influence. Parallel free incisions of the inflamed integument, extending through the true skin, and even outside the inflamed surface, followed immediately by the constant application of cold carbolic acid, or bichloride of mercury solutions, offer much relief, and probably shorten the period and lessen the intensity of the disease. The incisions should be made within three or four lines of each other, and others may be made at right angles with them. This plan is based largely, of course, on the parasiticidal properties of the agents employed as local applications. This plan, however, cannot be employed at all times on the face, neck, and hands of patients, for obvious reasons. Dr. G. H. Coombs, house surgeon at Bellevue Hospital, carried into effect many of the local methods of treatment just mentioned, with assiduity and intelligence, but the results arrived at, do not warrant a change of the statements already made, bearing on the methods of the local treatment. The complications of the disease are to be watched for and met, as they appear, with the special means applicable to them. No one method of treatment of erysipelas can, as yet, be said to be *the* treatment for this disease. However, iron internally, cold antiseptic solutions externally, with (preferably) or without the employment of local scarification, appear to be the most efficient medicinal means yet employed to combat this disease in the human subject.

# THE ETIOLOGY AND TREATMENT OF HOSPITAL GANGRENE DURING WAR.

## L'ÉTIOLOGIE ET LE TRAITEMENT DE LA POURRITURE D'HÔPITAL DANS LA GUERRE.

## DIE ÄTIOLOGIE UND BEHANDLUNG DES HOSPITALBRANDES IM KRIEGE.

BY WM. VARIAN, M. D.,

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At the outset of the War of the Rebellion, among the many complications arising in the treatment of the wounded, none created more concern in the minds of the surgeons of our army than Hospital Gangrene.

Stepping immediately from civil life into the active practice of military surgery, as the majority of them did, without any previous apprenticeship, special training, or study, they encountered in hospital gangrene a disease known only, to the most of them, through their books, and it was not until they had become familiar with its features that they learned to skillfully grapple with and overcome it.

In the brief limits of this paper, I have determined to confine myself almost entirely to giving the results of my own personal observation and experience, obtained during the War of the Rebellion, from 1861 to 1865, during which time my opportunities for the study of this disease were, at least, fully equal to those of any surgeon in the service; trusting that I may thus elicit from those who have had later experience all that modern research has developed to throw light upon this disease.

### DESCRIPTION.

Upon visiting wards occupied by men whose wounds have heretofore been progressing favorably, we find one or more complaining of having passed a restless, sleepless night, and of suffering from a burning, stinging, or gnawing sensation in and around the wound. On examination, we find that the lively, healthy granulations of the day before are now livid and dull, have lost their tone, and are ready to bleed at the slightest touch, while the production of fresh granulations has ceased.

All portions of the wound which have already cicatrized have become livid, while an erythematous or erysipelatous areola extends for a short distance beyond the edges of the marginal skin. The marginal skin is itself thickened and everted. A very tenacious, ashy-gray slough rapidly forms over the surface of the wound, closely adherent to the subjacent tissues, and extending, with special rapidity, through the areolar tissues. Owing to its avidity for the areolar tissues, the disease rapidly undermines the skin, and tends to isolate the muscles and tendons by following the areolar tissues in and around them. Skin and muscle are also attacked, but offer greater resistance to the destructive process, and succumb slowly. The wound steadily enlarges by the breaking down of the soft tissues, the slough increases in density, and dark patches form upon its surface, apparently from portions drying into a scab, although, generally, the slough preserves a soft and moist condition, while a thin, grayish, watery ichor is constantly oozing from it. The disease is not self-limited, no line of demarcation forms, and, unless arrested by treatment, it steadily progresses so long as the life of the patient continues. Of all the soft tissues, the blood vessels and nerves alone resist the destructive influence of the disease and remain intact in the midst of surrounding death. Meanwhile, the facial expression of the patient is anxious and pale, the pulse weak and frequent, and all the evidences of general failure of the vital powers progressively present themselves until death closes the scene.

Such is a typical case of hospital gangrene when uninfluenced by treatment.

### MICROSCOPIC STUDIES.

During the war negative results only were obtained by microscopic investigations. None of the numerous observers who made a study of the pathology of this disease reported any pathogenic germ or spore, peculiar to hospital gangrene. Infiltration of the tissues with croupous exudates, and the pathogenic germs and bacteria common to all destructive processes affecting the soft tissues, were alone demonstrated by the microscope. But since that time later investigators claim to have been more successful, and I trust to learn from some of them to-day the nature of the pathogerm which gives rise to this disease.

### ETIOLOGY.

A certain amount of obscurity shadows the etiology of hospital gangrene, but, from my own observation, I would always predicate the following conditions as necessarily present before the outset of the disease :—

1. A wounded or abraded surface, presenting a solution of the continuity of the skin or cuticle, is a *sine qua non* to the production of the disease. I have never, myself, seen, nor have I ever heard of, a case of hospital gangrene occurring, unless a wounded surface first existed to serve as a nidus for the disease.

2. Non-recent wounds are most liable to attack. It is in accordance with my personal observations that the wound attacked should be in the condition of granulation. In no instance in my experience was a freshly-wounded surface ever attacked by gangrene, although many such wounds were exposed to the influences which gave rise to the disease, and were even frequently exposed to the possibility of direct contagion. Neither in the voluminous reports which passed through my hands, was a recent wound ever mentioned as the seat of an attack.

3. A direct depressing influence upon the general vital forces is prodromic of the onset of the disease. Among the most prolific of the apparent causes of hospital gangrene was the prolonged existence of a low barometrical pressure, and the prevalence of cold and wet, or hot and moist weather for several days preceding an outbreak of the disease. Nor was the vital depressant confined to the atmospheric influences. Exposure to the influences of insufficient food, imperfect care, and mental depression, appeared to be no mean factors in producing a susceptibility to the morbific cause. This was made manifest by the larger proportion of cases of hospital gangrene occurring, *ceteris paribus*, among the exchanged or paroled wounded, who had been for some days in captivity after a battle, as well as among the wounded captives in our own hospitals.

4. Some, as yet undiscovered, septic poison or pathogenic germ communicated to the wound through atmospheric or direct conveyance, is evidently necessary to the production of the disease. As deduced from my own experience, this proposition is purely theoretical, and was not demonstrated and proved either by myself or others ; but it was the conclusion forced upon me by a careful correlating of the facts observed in a four years' observation of the disease in field and hospital.

5. Hospital gangrene is a local and not a systemic disease. This was satisfactorily proved by the occurrence of the disease, in one wound only, of a patient suffering from multiple wounds, and being confined by careful treatment to the wound of original invasion, while the other wounds of the patient continued to progress favorably. This was more than once observed by myself and others, and proved to us conclusively the local nature of the disease.

6. Once established, the disease is contagious, and can be conveyed from wound to wound by carelessness on the part of the surgeons and dressers. This fact is so patent to all who are familiar with the disease, as to require no demonstration. The simple statement suffices.

Such, in brief, is the etiology of hospital gangrene, deduced from my own personal observation and experience, together with that of the many hundreds of my co-laborers

in the vast field of military surgery, in which we toiled during the four years of our civil war.

TREATMENT.

This disease being, in the opinion of the writer, purely local in character, and the systemic effects being simply the result of the destruction of tissue and the absorption of septic material during the struggle of nature with the disease, it follows that treatment, to be successful, must be largely of a local character. In applying remedies for the purpose of arresting the disease, it is not only necessary that there should be entire absence of all timidity and hesitation on the part of the surgeon, but there must also be an apparent recklessness, in the eyes of the uninitiated, as to the amount of tissue invaded and destroyed by his remedies.

Under anæsthesia, with forceps, knife and scissors, the surgeon must first remove every portion of diseased tissue within the reach of his vision. In doing this he must disregard the amount of tissue involved, and go boldly to the bottom of every sulcus and sinus, fearlessly invading the apparently sound tissues beneath, until he has removed all visible traces of the disease. Having thus thoroughly cleaned out the sore, he must then attack it with powerful destructive caustics, which will char and destroy the remaining devitalized tissues, and so reach beyond the influence of the diseased process to the actual healthy structure below. No temporizing will do; every sinus must be explored to its bottom, and the caustic thoroughly applied to every part. No burrowing beneath the overhanging skin must escape his careful and thorough exploration, and, in all cases where there is a possible doubt of his being able to reach the utmost limit of the destructive process, the hypodermic syringe must be resorted to, to carry the caustic beyond the limits of the disease. To the inexperienced, this looks like barbaric recklessness, but it is indeed true conservatism, and when thoroughly done, the relief from the gnawing pain of progressive disease is immediate, placidity takes the place of anxiety in the facial expression, and the beautiful crop of healthy granulations which appear on the separation of the slough are a sufficient reward to the surgeon, as well as a certain indication of a successful result. A return of the gnawing pain will be a sure indication that the surgeon has failed to reach the limit of the disease, and will demand his immediate and thorough attention.

The nature of the caustic used is of less importance than its thoroughness of application, provided always that it is sufficiently powerful to completely destroy the tissues to which it is applied. Bromine, nitric acid, and the acid nitrate of mercury were those most generally resorted to by our surgeons during the War of the Rebellion. My personal experience was confined to the first two mentioned. With the increase of experience, as the war progressed, I learned to rely upon Bromine as the surest and most effectual caustic that I could use in the treatment of the disease. When thoroughly applied, it never failed to arrest the progress of the disease, and, although a very disagreeable remedy to handle, yet, once properly used, it rarely required repetition, and the disease lost its terrors, and was conquered as soon as attacked.

It is scarcely necessary to more than allude to the constitutional treatment which these cases demand. It differs in no respect from that required in all cases of extreme vital depression or systemic septic poisoning. Proper alimentation and sufficient assimilation are the cardinal points to be aimed at in the general treatment, together with such support and stimulation as the condition of the patient demands. No rules can be laid down to accomplish this, and no intelligent surgeon requires them.

Such is the nature and treatment of hospital gangrene, as it appeared to me in an observation of the disease during four years' experience in our civil war.

Holding the views of its nature and cause which I have here set forth, need I say that I look to see it wholly eliminated from the military surgery of the future? If, as I believe, this is a local disease, originating in wounds through some taint conveyed

during certain meteorological conditions, then the rigid application of the rules of aseptic surgery to the field-surgery of the future, will result in the total disappearance of Hospital gangrene from the reports of military surgeons.

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# THE ETIOLOGY AND TREATMENT OF CAMP DYSENTERY AND DIARRHŒA.

## L'ÉTIOLOGIE ET LE TRAITEMENT DE LA DYSSENTERIE ET DE LA DIARRHÉE DES CAMPS.

## DIE ÄTIOLOGIE UND BEHANDLUNG VON LAGER-RUHR UND DURCHFALL.

BY CHARLES WESLEY BUVINGER, M. D.,

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I will premise my remarks by saying that my term of service during our late Civil War began with the bloody battles before Corinth, Miss., October 3d and 4th, 1862, and ended at Little Rock, Ark., August 13th, 1865. During this period I was assigned to duty in the general hospitals at Corinth, and later in the general hospitals at La Grange, Tenn. Subsequently, I was with the 80th Ohio Infantry, at the siege of Vicksburg, and constantly thereafter, in the trenches, in camp, on active duty in the field in time of battle, on the march by land, water and rail, thousands of miles, through sixteen States of our Union—but principally in the South—my regiment composing a part of the 15th Army Corps, commanded by the brave, the dashing, the loved and lamented General John A. Logan, U. S. Army.

Dysentery and diarrhœa are most intimately related, especially in their chronic form, and it is difficult to separate them in a short article ; therefore, bear with me if I should speak of them frequently in union.

Camp and army life was peculiarly productive of the class of diseases which we are about to discuss, for the reason that all the habits of living of the soldiers were suddenly and radically changed.

During our Civil War, our armies were composed of men from the humblest to the highest positions in life ; from the most illiterate to the most brillant college-bred scholars of our land ; from all vocations and professions.

It was such men, deprived of home comforts and good and wholesome food properly prepared, that furnished the unprecedented number of cases of acute diarrhœa of *one million, two hundred and sixty-nine thousand and twenty-eight*, and of chronic diarrhœa, one hundred and eighty-two thousand, five hundred and eighty-six, or a combined total of *one million, four hundred and fifty-one thousand, six hundred and fourteen*, which Surgeon Woodward reports in the "Medical and Surgical History of the War of the Rebellion."

The same author reports of acute cases of dysentery, two hundred and fifty-nine thousand and seventy-one; and of chronic dysentery, twenty-eight thousand, four hundred and fifty-one; or a combined total of *two hundred and eighty-seven thousand, five hundred and twenty-two*, comprising a grand total of both diseases of *one million, seven hundred and thirty-nine thousand, one hundred and thirty-six*. The total number of deaths recorded from both diseases, acute and chronic, is forty-four thousand, five hundred and fifty-eight.

From the careless manner in which many of the records were kept (excusable perhaps during hard marching in an active campaign), many cases reported diarrhœa, should have been reported dysentery, especially in the chronic form of diarrhœa. The figures showing the mortality are doubtless incorrect, for many a poor fellow was discharged from the service who went home only to die.

Among the causes which produced dysentery and diarrhœa during the siege of Vicksburg, in the summer of 1863, was the character of the water. The besieging army was encamped in ravines on the proximate hill-side to the besieged. At the bottom of these ravines, water was procured in abundance from shallow wells, four or five feet deep, in which headless barrels were sunk for curbing. It was quite clear, but had a disagreeable, inky taste. It was this water (I am confident), that induced a furious attack of diarrhœa in the writer, for I was affected immediately thereby, having had no symptoms whatever of the disease during the preceding eight months of my service elsewhere. This was in the month of June. The whole regiment of about 700 men, was more or less affected. Sometimes there would be from sixty to eighty reported at the daily morning "sick call," the vast majority of whom were suffering from diarrhœa or dysentery.

Malarial and scorbutic causes doubtless contributed, for intermittent and remittent fevers and scurvy also prevailed, from which latter complication a number died.

I must not fail, in this connection, to mention another frightful cause of diarrhœa, from which the writer and a number of other officers severely suffered. I mention it, too, as a warning to any present who may hereafter become army surgeons, that they may not be engulfed in the same Charybdial manner.

After the surrender of Vicksburg, and when the port had been fairly opened, speculators and small traders came rushing in. Among these was an itinerant Sutler, a veritable son of Abraham, who, on account of his wares, and for mutual benefit and profit, was duly installed as the honorable sutler of the 80th Ohio. Among his miscellaneous assortment of goods he had for sale what he denominated bottled "champagne cider," that is, cider charged with carbonic acid gas. He had also a fine lot of old-fashioned (two-for-a-cent) ginger cakes, but he did not sell them at that figure! The paymaster had not yet been around, and so a number of officers, the writer included, pooled their issues and bought a box containing a dozen bottles of the cider, and a lot of the ginger cakes. We had been living on salt rations and "hardtack" so long that we craved something better. We had a glorious time! Joy was unconfined, as we drank from the same canteen! There was a feast of cakes and a flow of cider! In a few hours thereafter we heard from it! Every member of that festive company was a doubled-up, seething, fermenting yeast pot! No Confederate bombshell ever got in its work more effectually than did that mixture! It laid us all out flat! We more than half suspected the sutler to be an emissary from Jeff Davis, but he declared "dot he vas an Israelite, indeed and in troot, in whom dere vas no guile."

Now, some wise, scientific fellow, an adept in microscopy, might have said that it was the presence of the frisky bacillus which did the business for us; but I am confident that every member of that noble band of sufferers, was of the unanimous opinion that it was the ginger cakes and cider which created the tumult!

Time will not permit me to dwell on all the causes that might have produced dysentery during our Civil War; but, as it occurred, there was no instance in which it could be considered contagious. There was no reason to ascribe it to microörganisms, or to a specific germ or parasite; and, indeed, the most diligent recent microscopic research in this direction has proven, that its causation is not due to the presence of bacteria, or a special bacillus. About the truth is (as far as has been discovered), dysentery is due to the conjoined operations of all the various causes met with in army life. Koch, it is true, has discovered, in dysenteric dejections, a special bacillus, similar to a comma in

form—a sort of first cousin—to the cholera bacillus, but larger in size, though a drone, and not nearly so active and enterprising as its more diminutive congener. Its presence is no proof of the cause of dysentery, and need not frighten us off our base!

Whether the causation be from extreme heat combined with moisture; from malarial or paludal influences; from badly-prepared or septic food; scorbutus, or to the fatigue, privations, and overcrowding, incident to armies in active operations—from any one or a combination of these, or otherwise—the great desideratum, after all, is to know how to cope with the cause. How shall we successfully treat diseases so formidable as dysentery and diarrhœa in their acute and varied forms?

There has been no consensus of opinion as to what is the best method of treatment of dysentery. Opinions, in regard to treatment, have been as diverse and discordant as those have been in regard to the real cause of the disease. If we consult the prominent authors who have written upon the subject for the past three hundred years, we still remain in doubt as to what are the best therapeutical means to be used. In the light of present knowledge, general blood-letting, and mercury, in large doses (once so universally employed), need only to be mentioned to be condemned.

In that excellent and valuable monograph "On the History of the use of Ipecacuanha in Dysentery; an Illustration of Changes in the Practice of Medicine," by John Macpherson, M. D., Inspector General of Hospitals (retired) in Her Majesty's Bengal Army, he quotes sixty-two authors, from 1625 to the present time, who have expressed their opinions, *pro* and *con*, upon the virtue of Ipecacuanha in the treatment of dysentery.

From the time that Piso, of Brazil, in 1649, gave a distinct account of ipecacuanha to the world, until about 1706, it was universally lauded, and by some writers considered to be almost divine. We all know what notoriety and emoluments Helvetius gained, in 1689, by curing the Dauphin of France of dysentery, with this drug.

To show the difference of opinion in regard to ipecacuanha, I will give a few quotations from Dr. Macpherson's monograph. He writes:—

"The chorus of praise of our remedy now [1706] begins to be interrupted. White, in 1712, writing on 'fevers,' says, incidentally, of his practice in Portugal: 'But, ordinarily, dysenteries contemn all the most celebrated specifics, whether radix ipecac, though repeated till you weary the patient.' He gave large doses. In one case one drachm twice, in another one scruple, and then two scruples twice; he makes the observation that 'ipecacuanha is not worth a rush till the distemper begins to decline; that then, and for some time after, it is admirable, but of no use when the disease is chronic.'

"In 1741, Geoffrey, a very sound authority, says that ipecacuanha often cures in the course of one day, as if by enchantment. It is comparatively useless, unsupported, in epidemics. It is better for confirmed than for commencing dysentery. Sometimes it does not cure, because the disease of the bowels has gone too far, but it never does any harm! As to dose, he says: 'with us it is ten to thirty grains in substance.'

"In 1758, F. Home, in his 'Principles of Medicine,' says: 'Ipecacuanha may be given to unload the stomach, or, given in smaller doses, viz.: five grains every sixth hour; it produces the most excellent effects, but few are able to bear the nausea.'

"In 1785, Sir Gilbert Blane thought highly of ipecacuanha, but gave doses only of two, sometimes only of one grain.

"Cullen, in 1781, 'Practice of Physic,' Vol. III, said that ipecacuanha seemed to possess no specific virtue; it proved useful only when so managed as to operate chiefly by stool.

"Hunter, in his 'Diseases of Jamaica,' 1796—although he gave by far the best account of the pathological changes which occur in dysentery which we have, up to 1845—can scarcely be said to mention ipecacuanha at all.

"In the same year [1832], Forget, in his 'Medicine Navale,' thinks little of the use of ipecacuanha, and called the Spanish practice with it 'incendiary.'

"Parkes, in 1846, considered that the place of ipecacuanha in the treatment of dysentery was quite a secondary one, but that doses of from one scruple to one drachm are far more efficacious.

"The French appear to use the drug pretty freely in their colonies; but the Germans have not, for a long time, talked enthusiastically of it; and in a treatise just published by Dr. Martin (on the diseases of South Chili, of which dysentery is the chief), ipecacuanha is not once mentioned in its treatment, while simaruba is said to be the proper remedy."

During our Civil War, ipecacuanha was extensively used, but usually in combination with astringents, such as opium, acetate of lead, and tannin. Sub-nitrate of bismuth was also largely used.

The writer, during his army experience, faithfully tried ipecacuanha in large doses (from a scruple to a drachm), preceded by tinct. opii, in medium doses, from five to ten grains, and in small doses gradually increased. The only effect produced was to vomit, or intensely nauseate, the patient, without any mitigation of the disease. I abandoned it in disgust.

Have we, then, no remedies on which we can confidently rely to relieve and cure, promptly and effectually, both in its acute and chronic forms, such a formidable disease as dysentery? I unhesitatingly answer, yes.

The writer has found, in pure, fuming nitrous acid, 43°, a remedy, in combination with tinct. opii, at once pleasant, prompt and reliable—a remedy as near a specific as any remedy well can be. This is nothing less than the remedy, in a modified form, recommended so strongly by Hope, three-fourths of a century ago. To be effectual, the preparation must be pure. It must be *nitrous*, not nitric acid. With the latter as a substitute, you will ignominiously fail.

Hope, combined the acid with aqua camphora, but that is not essential, as plain water answers just as well. His dose, also, was too large. His formula was one drachm of nitrous acid and eight ounces of camphor mixture, to which was added forty drops of laudanum. Two ounces of this were to be given every three or four hours. Now, in one fluidrachm of nitrous acid there are one hundred and sixteen drops, as dropped from a minim measure. No stomach or bowels would tolerate at a dose, twenty-nine drops of the acid as manufactured by Powers & Weightman, of Philadelphia.

To be successful, it should be administered well diluted with water, sufficient not to set the teeth on edge. My formula is one drachm of the acid, six ounces of water, two or three drachms of tinct. opii—depending on severity of the tormina and tenesmus—and quantum sufficit of simple syrup to make an eight-ounce mixture. Of this, a tablespoonful in a wineglassful or more, of water, to suit the taste, is ordered every three hours. The patient is required to keep in bed, and to resist the desire to go to stool. Each tablespoonful of the mixture contains about *eight drops of the acid*, and that is quite sufficient as a dose, and is the maximum quantity for an adult, by which I gauge the dose for children, according to the rules of prescribing.

This remedy, unlike ipecacuanha, is agreeable to take, and never nauseates or depresses, and can be continued as long as necessary, without injury. It will accomplish all that ipecacuanha can, with all its boasted virtue, and more, for it is equally serviceable in the chronic as well as the acute forms of the disease. In the milder forms, a few doses will abort it.

I lay it down as a fundamental principle, that the treatment of dysentery should be conducted by the antiseptic method. Surely, the gangrenous odor of the dejections ought to arouse suspicion of what is going on within the bowel, and should at once suggest antisepsis. Now, this is just what the nitrous acid accomplishes. It is a powerful

antiseptic. Disinfect the bowels, and the victory is half won. It prevents general septicæmia and abscess of the liver, which ipecacuanha cannot do.

Who among us, in treating puerperal septicæmia, has not witnessed the benign influence of antiseptic solutions in irrigating the uterus? How quickly the temperature, previously at an alarming altitude, drops, after a thorough irrigation, to normal, the patient becoming calm and cheerful. Nitrous acid accomplishes, for the dysenteric patient, just what antisepsis accomplishes for the puerperal. It deodorizes the dejections, and fever, if it be present, quickly subsides; the stools become feculent, and convalescence is soon established.

The writer has never encountered the desperate cases described by the older authors as "struck with death from the very beginning, the disease proving fatal in a few days." Such examples must be those described by the writers in India as "contagious" and "malignant." Don't write upon their tombstone "Struck with death from the beginning;" but rather write "Died by the poison of my own excretions, which might have been neutralized and rendered harmless, had my physician adopted the antiseptic plan of treatment."

To preserve the acid in its purity and integrity, it should be kept in, and dispensed from, a dark-colored four-ounce glass-stoppered bottle. I would not give a fig for an article dispensed from a pint or quart bottle which has been opened scores of times.

Do not understand me to mean that the nitrous acid alone is an infallible remedy for the cure of all dysenteries. I lay this down as a truism, *that there can be no one or universal remedy for all dysenteries.* As we sometimes meet with the disease in its advanced chronic forms, we will need other aids. In the *oil of turpentine* we have a powerful and efficient auxiliary. It is, likewise, an antiseptic. When there is a hemorrhagic tendency, the oil of turpentine is more appropriate. But your success in treating your case with this remedy will depend upon the mode of administration. You cannot cram raw turpentine—that is, turpentine dropped on a lump of sugar—down any one's throat, very long, before he rebels. It must be rendered so palatable that even a child will not refuse it. The following formula, which I have used successfully for years, will meet every indication:—

To one and a half ounces of powdered acacia, add two and one-fourth ounces oil of turpentine. Mix. Add three ounces of water, gradually, rubbed in a mortar, until it form an emulsion. To this add, gradually, six ounces of simple syrup. Agitate well in a twelve-ounce bottle. This makes an elegant twelve-ounce mixture, each drachm of which contains twenty drops of turpentine, as dropped from a minim measure; and this no one will refuse to take.

To four ounces of this preparation, I add one drachm of tinct. opii, to prevent undue catharsis and to quiet pain. More laudanum can be added, if necessary. To an adult, I usually administer it in full doses, a teaspoonful every three hours. Strangury (which is the exception and not the rule) is not so apt to ensue when the oil is administered in ten or twenty-drop doses as when given in smaller quantities, and the effect is better. This is a most valuable remedy in chronic dysentery and diarrhœa, and I have had brilliant success in the treatment of both in their chronic forms.

I sometimes use the nitrous acid and the turpentine emulsion, interchangeably, with excellent advantage, when the patient has wearied of taking the one or the other. I have found injections to be rarely necessary. With these two remedies—if the disease be not already beyond the reach of remedial agency—I feel confident of successfully treating any case of acute or chronic dysentery, and chronic diarrhœa, when the latter has assumed the form of follicular enteritis.

As to diet, that must be absolute. You must lay down a bill of fare. Milk, and farinaceous articles of food, must be rigidly adhered to; but oysters—better raw than cooked—and raw scraped beef may be allowed after the worst symptoms have yielded

to treatment. Fruits and vegetables of all kinds I have found to be pernicious. If tapeworm puts in an appearance under the raw meat diet, it is a very easy matter to serve an effectual peremptory four or five hours' notice on his longitudinal majesty to evacuate the premises!

If scurvy be present, fresh lemon juice, or citric acid, must be freely administered. If there be a malarial complication, quinia, in scruple doses, should be given four hours before the time for the periodical exacerbation. It is surprising how quickly the symptoms yield, under such circumstances, to the use of quinia, as the writer frequently observed at Resaca, Ga., in the summer and autumn of 1864.

In the treatment of acute diarrhœa in the army during our Civil War, the remedies principally used were opium, ipecac, tannin, acetate of lead, calomel, and mercury with chalk. Subnitrate of bismuth was also used. The writer himself, having had repeated attacks of the disease, had abundant opportunity of testing the efficiency or inefficiency of these drugs on himself, as well as on the men of his regiment. I have tried all these remedies, in various combinations, with only partial success. After my most severe attack, already mentioned in the episode with the cakes and cider, I became so much reduced that I thought I should never again see "God's country," as the boys used to lovingly call their home, the North. I applied for a leave of absence, and had been examined by a Medical Board of three army surgeons, and was recommended to be sent North. The recommendation was approved by the Medical Director of the Army and Department of the Tennessee, Surgeon John Moore, now the worthy Surgeon General of the U. S. Army. The application was returned to me "*Dis*approved for the *present*" by order of Major-General McPherson. I was not happy!

Remaining at my post of duty—all previous methods of treatment having failed—I began to experiment on myself with a combination of calomel, ipecac and opium. After a number of unsatisfactory trials in compounding the ingredients in various proportions, I hit upon the following, viz.: calomel, two grains; ipecacuanha, three grains; and opium, five grains. Mix thoroughly, and divide into ten powders. Here there was a compound, each powder of which contained two-tenths of a grain of calomel, three-tenths of a grain of ipecac, and a half-grain of opium. I took a powder every three hours, and I was cured so rapidly that I was fairly surprised.

After I had recovered, I wrote a formula for three hundred powders of the same, and ordered my hospital steward to have them ready for "surgeon's call" the next morning. The usual "diarrhœa brigade," together with a lot of new recruits, were presented by the orderly sergeants. To each man suffering from diarrhœa I gave five powders, with instructions to take one every three or four hours, and to remain perfectly quiet in quarters. I soon noticed the same magical effect produced on the men as had been produced by the treatment on myself. The number of sick rapidly diminished, and, after the more chronic cases had either been sent North on furlough, or to general hospitals, and the men and officers had had abundance of anti-scorbutics, such as potatoes, sauerkraut, "chowchow," etc., and scurvy had been pretty well eradicated, there were very few men left on the sick list.

I have ever since, in my private practice, used the same formula for diarrhœa, and especially for the summer diarrhœa of children, and I have found nothing better. Under this remedy the liver is gently stimulated, peristalsis is restrained, and pain is subdued. The stools soon assume a better color, lose their offensive odor, become less frequent and more consistent, and finally become normal. Of course, with children, and especially children under six months, the rules of prescribing *must be rigidly adhered to.*

We conclude, then, that nitrous acid *in its purity*, combined with tincture of opium in the treatment of dysentery in many of its forms, is the remedy *par excellence* above all others. It forms, with syrup and water, a palatable drink, and is agreeable to the

patient; it does not nauseate nor depress; timely administered it will prevent all chronic cases, and obviate danger of abscess of the liver. It is tonic, astringent, and a powerful antiseptic. It is certain and reliable, and will perform its work *cito, tuto, et jucunde.*

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# THE BEST FORM OF REPORT OF DISEASES AND WOUNDS, REGARDED FROM A STATISTICAL STANDPOINT.

## LA MEILLEURE FORME D'UN RAPPORT SUR LES MALADIES ET LES BLESSURES POUR EN FACILITER LA STATISTIQUE.

## DIE BESTE FORM EINES BERICHTES ÜBER KRANKHEITEN UND VERWUNDUNGEN VOM STATISTISCHEN STANDPUNKTE BETRACHTET.

BY JOSEPH R. SMITH, M. D.,

Brevet-Colonel, Lieutenant-Colonel, and Surgeon U. S. Army.

Military surgeons of most civilized nations make two different kinds of reports of the sick and wounded of the army.

One kind of report is made daily: is for purely military purposes, and gives the number from the army unfit for duty on account of sickness, wounds and injuries. It merely furnishes data to aid the commanding officer in determining the effective strength of his army.

This report is not here in question. The other kind of report, *monthly*, *quarterly*, or *annual*, is largely statistical, though more than numerical. It is called a "Report of Sick and Wounded."

Regarded merely from the statisticians' point of view, this report should supply data from which to ascertain, in a large number of healthy men in determinate conditions of life, the number and nature of diseases and injuries occurring, their results, and the amount of service and labor lost therefrom, computed in days.

It should give: 1st. The number of men taken sick or injured.

2d. The disease or injury in each case.

3d. The disposition of each case, under the headings "Returned to Duty," which implies cure — "Transferred" — "Discharged from the Service for Disability" — "Deserted"—"Died"—and "Remaining under Treatment."

4th. The numerical strength of the army. As the facts thus recorded are also the data by which pensions and similar allowances are granted to the disabled, and to the widows and children of the dead soldier, they should be sufficiently full and accurate, on the one hand, to enable deserving beneficiaries to obtain without fail the allowances granted, and, on the other hand, to protect the government against the false claims of pretenders.

The form of this report varies somewhat in different armies, and is occasionally changed. Now, what form is best for the attainment of its objects?

In all armies whose forms or regulations I have been able to examine, the forms are framed so as to include the headings before specified. In the Austrian, French, and Prussian armies, the report embraces officers and soldiers only, not referring to women and children.

This is almost equally true of the British Army. In this army, at certain places,

women's hospitals are provided for the authorized families of the soldiers, and these hospitals make their own report. But in the other reports of sick and wounded of the British Army, viz.: W. O. forms 294–294[a]–294[b]–298–464–516–517–823–893–893[b]–986, and the abstracts containing the tables in the annual reports of the Army Medical Department, women and children are only mentioned in two; while in the printed form of "Annual Sanitary Reports" made by the principal medical officer (516–517) and which are the chief reports, the abstract of specific diseases contains the directions printed: "medical officers will be particularly careful that no diseases of women and children are included."

The form in use by the United States Army Medical Department was only adopted in 1883, and is a bulky, awkward paper. Besides the statistics heretofore spoken of, it is arranged to contain the military history of the army; statistics of sickness, deaths, vaccination, births and marriages among a greater or less number of civilians in the vicinity; and statistics as to age, nationality, birthplace, and length of service of the sick soldier.

Of course, these facts are valuable to the general statistician; and the work of collecting them is suitable for a city office or bureau of statistics, where such facts may be hunted up, tabulated and analyzed; but it is unsuitable in actual military service on the frontier. The central bureau has abundant space, sufficient time, and numerous clerks; the military surgeon serving with troops generally has neither time, space, nor clerical aid. He must, therefore, delegate the preparation of these reports to unfit persons, and the more complicated the report is—the greater the number of subjects embraced by them—the more sure they are to be inaccurate.

The medical officer, more or less pressed by his proper work, cannot but regard these studies as foreign, and as interfering with his legitimate duty; they must receive but perfunctory attention, and carelessness and indifference, thus engendered, renders sure the presence of inaccuracies.

The frequency with which these reports are returned for correction (from the Surgeon-General's office in Washington) to the officer making them, testifies to the correctness of this view.

For various reasons, it is desirable that these reports should be uniform in the different armies; and, as the simpler they are, the more probable their correctness, and the easier to secure the adoption of one form in all armies, it seems clear, that this uniformity should be attained, not by complicating the more simple, but by simplifying the more complicated.

Facts concerning women and children, surrounding nations, military movements, or current events of interest, should be given in special reports; the "Column of Remarks" in the "Report of Sick and Wounded" containing only information necessary to the understanding of the report itself. Such special reports as are ordinarily called "Report of Wounded," "Report of Surgical Operations," "List of Wounded after Action," "Reports on Secondary Hemorrhage, Tetanus and Pyæmia," are of the greatest value. But they are irregular as to periodicity, because, cases to be reported in them occur infrequently, and in some commands never; while cases to be reported in the paper I am discussing are constantly occurring. This report, to show the exact health and the percentage of diseases, etc., in the large body of men forming modern armies, should embrace every case of disease or injury occurring among the armies.

It might be thought unnecessary to argue this point; but, in certain armies, the practice has prevailed of including only those cases admitted to hospital, while in the report of the United States Army Medical Department the rule is, to report those excused from duty on account of sickness or injury, and none, but those so excused by the surgeon. Obedience to this rule inevitably necessitates incomplete and imperfect statistics of diseases, because many cases, though occurring, will be unreported.

Syphilis, gonorrhœa, and skin diseases frequently occur, whose successful treatment requires no excusing from duty, while, in even more serious cases of these diseases, officers and privates (both) will prefer to do their whole duty, rather than be excused, and thus have made public the malady from which they are suffering. So also occur parasitic diseases, tumors, ear diseases, even to unilateral deafness, never requiring excuse from duty, while phthisis, cancer and other diseases of the gravest character may be treated for a long time in their incipient stage without any excuse from duty, after which the subject may be discharged by termination of service, and the disease progress to death. The writer has known a company clerk, a soldier (ruptured himself), still perform his clerical duty, and be neither excused, nor reported as a case of hernia; while commanding officers will frequently excuse themselves and those directly under them from duty, the surgeon treating them, but never excusing them. This has frequently occurred under the writer's observation.

Surely, enough has been written to show the inaccuracy of statistics from reports thus made.

A few words will here be needed as to nosology. It seems better to have the names of the most frequently-occurring diseases printed on the form, on account of economy of labor, the work of printing names in an office being easier than that of writing them in active service. Besides, the order of enumerating diseases will thus be uniform, and not left to the discretion of each officer, the theoretical views of any one of whom may differ from that of his next neighbor. Probably the diseases thus named will vary in number between 150 and 200.

No classification of diseases has been yet devised absolutely above criticism. A really philosophical one must be founded on either Etiology or Pathology; and our knowledge of these is incomplete and subject to modification.

To illustrate, under the head of "Parasitic Diseases," no one can say what diseases may not, in the near future, be included, considering our increasing knowledge of microbes, and their functions in disease production.

By the classification in use in the U. S. Army, "Diseases and Injuries" are divided into five classes, viz.: 1st, Zymotic, 2d, Constitutional, 3d, Parasitic, 4th, Local, and 5th, Violent Diseases and Deaths.

The Zymotic Class is divided into the three orders, 1st, Miasmatic, 2d, Enthetic, 3d, Dietic.

The Constitutional Class into the two orders, 1st, Diathetic, 2d, Tubercular.

The Parasitic has no sub-orders.

The Local is divided into nine orders, such as Nervous System, Eye, Ear, Organs of Circulation, etc.

The 5th Class, "Violent Diseases and Deaths," is divided into four orders, viz.: 1st, Wound Injuries and Accidents, 2d, Homicide, 3d, Suicide, 4th, Execution of Sentence.

In the French Army six General Divisions are made. 1st, General Diseases, 2d, Local Diseases, 3d, Wounds, excluding Suicides and Accidents, 4th, Suicide and Suicidal efforts, 5th, Accidental Deaths, 6th, Diseases not classified.

The 1st General Division of "General Diseases" has five subdivisions. 1st, Fevers, 2d, Virulent Diseases (Enthetic), 3d, Diathetic, 4th, Diseases from alteration of blood, 5th, Diseases by poisoning.

The 2d General Division, "Local" is very similar in subdivisions to the same class in the U. S. Army, having, however, ten subdivisions instead of nine.

The 3d General Division, "Wounds," has no sub-orders, save as to site of wounds, and the 4th and 5th General Divisions are without formal subdivisions.

On the British form (W. O. 516–517) diseases are classified into five great classes of

1st, Zymotic, 2d, Constitutional, 3d, Local, 4th, Developmental, 5th, Violence, Deaths or Diseases.

The Zymotic class is subdivided into 1st, Miasmatic, 2d, Enthetic, 3d, Dietic, 4th, Parasitic.

The Constitutional class into 1st, Diathetic, 2d, Tubercular.

The Local class, almost as the former two described systems, save that the subdivisions are eight.

Developmental class is without sub-orders.

Violence, etc., is divided into 1st, Accidental, 2d, Battle, 3d, Homicidal, 4th, Suicidal, 5th, Executed, 6th, Punishments.

The abstract of diseases, however, published in the British Army Medical Department Report for 1884, differs somewhat from the foregoing: the divisions are still five, but the headings are: 1st, General Diseases, 2d, Local, 3d, Debility, 4th, Poisons, and 5th, Injuries, while the class of General Diseases is divided into a Febrile Group and a Constitutional Group.

In the Austrian Table, diseases are divided into 1st, General and Blood Diseases, 2d, New Formations, 3d, Diseases of Nervous System, 4th, Diseases of the Eye, 5th, Diseases of the Ear, 6th, Respiratory Organs, 7th, Circulatory Organs, 8th, Digestive Organs and Annexes, 9th, Urinary and Sexual, excluding Syphilis and Venereal diseases, 10th, Venereal and Syphilitic, 11th, Skin and connective tissue, excluding syphilitic forms, 12th, Bones, excluding injuries, 13th, Joints, excluding injuries, 14th, Muscle, Tendons and Bursæ, excluding injuries, 15th, Animal Parasites, 16th, Injuries, excluding Suicide and Self-mutilation, 17th, Poisoning, excluding Suicides, 18th, Attempts at Suicide and Self-mutilation, 19th, Malformations, 20th, Under observation, Simulated, Expectant, Other Cases.

The Prussian Army subdivision of Diseases is into 1st, General Diseases (Poisoning), 2d, Diseases of the Nervous System, 3d, Respiratory Organs, 4th, Circulatory Organs, 5th, Organs of Assimilation, 6th, Urinary and Sexual, excluding Venereal, 7th, Venereal, 8th, Eye, 9th, Ear, 10th, Integumentary, 11th, Locomotion, 12th, Mechanical Injuries, 13th, Other Diseases, including Self-mutilation, Attempt at Suicide, Simulation, General Debility of Body, Debility from Age, 14th, Under observation.

In 1884 the Surgeon General of the U. S. Army proposed for the criticism of the medical officers, a nomenclature of diseases, with a classification, as follows: Diseases arranged in two great divisions: 1st, Dependent upon Morbid Poisons, 2d, Dependent upon Other Causes than Morbid Poisons.

The 1st Division contained but one Class, subdivided into six Orders. 1st, Miasmatic, 2d, Diarrhœal, 3d, Malarial, 4th, Zoögenous, 5th, Venereal, 6th, Septic.

The 2d Division contained seven Classes, viz.: 1st, Parasitic, 2d, Dietic, 3d, Constitutional, 4th, Developmental, 5th, Local, 6th, Injuries, 7th, Illy-defined and non-specified Causes.

The Local Class included more than forty sub-classes and orders, and the Class of Injuries was divided into General and Local. The other classes had no sub-orders. The classification was illy received and not adopted.

After long experience and careful consideration, I am of the opinion that the "Table of Diseases" arranged in the Prussian service is most suitable in military service, and, with confidence, I submit for adoption the following form. It is not claimed that this form is perfect; but it is simple, compact, easily understood, easier to make out than any form known to the writer, and contains all the data necessary to determine the proportion of cases of disease or injury occurring in an army, and the results thereof; besides all the data needed to enable proper conclusions to be reached in regard to pensions and similar allowances. In connection with the foregoing, I offer to the Section, for adoption, or otherwise, the following propositions:—

1st. The main object of a "Report of Sick and Wounded" for an army, is to give the diseases and injuries; their number; their proportions occurring among the troops, and the results thereof; all other objects being incidental and secondary, or better effected in certain cases by Special Reports.

2d. For purposes of convenience this Report should be monthly.

3d. It is desirable that, for comparison and study, the form of this Report should be uniform for all armies, and as simple as may be.

4th. No nosological arrangement can now be made which commends itself to every one, and which all will agree on as the only one compatible with scientific knowledge; and, therefore, *that* nomenclature and arrangement of diseases should be adopted in this Report, which is most convenient for use in the exigencies of military service.

5th. In view of the great desirability of an uniform "Report of Sick and Wounded" by all armies, and in the absence of any other form better fitted to fulfill the ends for which this Report is made, this Section recommends the adoption of the subjoined form in the Medical Department of all armies.

[This Resolution, being adopted by the Section, was subsequently adopted by the Congress, and the "Report of Sick and Wounded" will be found in the Transactions of the Congress, Vol. I, pp. 71-74.

HENRY H. SMITH, *President of Section.*]

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# PRACTICAL CONSIDERATIONS ON HUMAN NOSOGRAPHY.

## CONSIDÉRATIONS PRATIQUES SUR LA NOSOGRAPHIE HUMAINE.

## PRAKTISCHE BETRACHTUNGEN ÜBER MENSCHLICHE NOSOGRAPHIE.

BY J. W. S. GOULEY, M.D.,

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This paper is extracted from a forthcoming work on the principles of nomenclature and classification of the diseases of man, and is presented to this Section at the request of some of the officers of the Congress, and by consent of the President of the New York State Medical Association.*

As preliminary to the practical consideration of human Nosography, the following questions may, with propriety, be propounded :—

1. Is there need of classification of any kind?
2. If so, what should be the basis of the classification of diseases?
3. What should be the character of the nomenclature of diseases?
4. What should be the method of the classification of diseases?

An answer to each of these questions will now be submitted to the decision of the Medical Profession, for no official nosography should be established except with the concurrence of the medical profession.

### I. IS THERE NEED OF CLASSIFICATION OF ANY KIND?

Despite the well-known aphorism, "system is the Ariadnean thread without which all is confusion," some of the highest authorities in science have been opposed to methodical arrangement. Among them may be cited the celebrated Buffon. Many of

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*The original paper, being too long to be read entire, was divided. The first part was read before the New York Association, and this, the second part, was read before the Section on Military Surgery of the Congress.

the physicians of the present time do not approve of classification, notwithstanding the fact that medicine is a science only by reason of the methodical arrangement of diseases, and that these physicians themselves are constantly classifying, for they think and therefore classify, and it is a fact that to think is to classify; therefore, in thinking they classify *nolens volens*. To think of an object is to recognize the properties which differentiate it from other objects, and consequently place it in its proper class—particular illustrations need not be given—but to make a general classification accurate and useful, requires profound thinking, a good understanding, sound judgment, persevering study, careful observation, persistent labor, untiring industry, and the coöperation of many men possessing these qualities. Nosotaxy, however, to be of practical utility to the medical profession and of much benefit to mankind, requires more than the coöperation of many men. It exacts the prompt and substantial aid of the very great majority of all true physicians in the world.

The answer to the first question is, that there is great need of a classification of the diseases of man, established upon a proper basis, which shall constitute an epitome of the science of medicine.

### II. WHAT SHOULD BE THE BASIS OF THE CLASSIFICATION OF DISEASES?

During this century, nosography has not advanced so rapidly as might have been reasonably expected. Among the chief reasons of this hindrance are: (1) that the establishment of a proper basis for its development has never been agreed upon by the medical profession, and (2) that no particular system of classification has been officially adopted by the profession; individuals and certain nations having each some special system of classification and nomenclature of diseases, with no apparent aim toward uniformity. In sundry nosographical arrangements the words, groups, sections, classes, orders, families, tribes, genera and species, are so loosely and carelessly employed that it is difficult to understand the meaning which these terms are intended to convey, used, as they often are, in violation of established principles of classification, for many classifiers employ them arbitrarily and do not take the pains to give their own definitions of these arbitrary terms.

The starting point in nearly all the systems of nosography is the symptom. This has led astray many nosographers who, mistaking symptoms for diseases, placed these symptoms in the category of diseases, notwithstanding the existing excellent rules for the guidance of the student of nosography. The system of Cullen having been judged the best was, for many years, in general use, and yet it was full of the most glaring errors, some of which he acknowledged in after years. Many of Parr's suggestions were excellent, but his system was as ill founded as those of his predecessors. Pinel's "*nosographie philosophique*," which superseded the nosology of Cullen in France, has long been obsolete. It failed, even after a very considerable number of revisions, probably because it was established upon the same faulty basis as that of former systems. The nosographical contributions of Récamier, of Richerand and of others, had no better success. More than forty years ago Doctor Williams classified and tabulated certain diseases upon a physio-pathological basis, but there halted.

It seems clear, that the great defect of all these systems is the lack of a stable basis upon which to erect the structure of nosography. This defect was long ago realized, but not remedied, and nosography had already shown signs of decay, when it was almost entirely reconstructed by Doctor William Farr and by the Royal College of Physicians of London. But even the modern English system is full of inconsistencies, although it is declared to be founded upon anatomy.

It is noteworthy, that nearly all the early general nosographers were at either extreme of adopting very few or very many classes, and that they failed to agree as to what should constitute classes, orders, genera, species, or symptoms, for these are scat-

tered throughout what at first sight seem to be the most methodical arrangements. Thus, phlegmasiæ are placed among classes by Sauvages, Linnæus and Sagar, and among orders by Cullen, Vogel, Macbride and Good. These, and many other blemishes already pointed out, occur from the time of Sauvages to that of Hosack, and are owing partly to the fact that too little attention has been bestowed upon species, notwithstanding the caution of Cullen—who, however, fell into the error he so much wished to avoid—and partly to the state of knowledge of physiology and morbid anatomy at that epoch. Although Doctor Good based his nosology upon physiology, he re-affirmed many of the errors of the older authors.

This want of agreement, and the absence of a substantial foundation and of associated harmonious labor, have given rise to the greatest confusion in the use of terms and in arrangement. This confusion, and the tendency of each nosographer to reproduce the inaccuracies of his predecessors, have greatly impeded the progress of nosography and have led to much unfavorable criticism and to the frequently-asked question, "Of what use is nosography?" This question is now often sneeringly asked by those who fail to appreciate the fact that, without the existing systematic arrangement of diseases, they could not have learned, and could not intelligently and successfully practice, medicine. In the beginning of this century, nosography was not regarded with much favor by many learned physicians both in England and on the continent of Europe, and the mass of the profession spoke of it contemptuously. Doctor Parr, in commenting thereon says: "Nosology is seldom mentioned but to be ridiculed and despised." *

Under the same head Parr says:—

"Systems are the work of our own minds; for nature advances by almost imperceptible shades, and where we cannot point out the termination of one family, and the commencement of another, it is only confessing that the intermediate link is unknown; thus, when our knowledge advances, the advantages of our system lessen, for our limits are lost . . . . . .

"If a foundation could be obtained, it was apparently by considering the disorder as connected with an internal change, which would then afford what might be styled an object, whose properties we might examine . . . . . .

"The great advantage of nosology is distinction, discrimination, etc. . . . . We still want a *delineatio morbi* in imitation of the *delineatio plantæ* in Linnæus."

How can proper distinction, discrimination, and a *delineatio morbi* be made, unless nosography have a stable foundation, such, for instance, as can be built from anatomy? As early as the year 1801 Bayle was of opinion that nosography should be founded upon anatomy, but the idea was never fully carried out, although Alibert named his families of diseases in accordance with the organs affected, and Richerand and others made similar attempts, and although the modern English system is avowedly founded upon anatomy. †

It was an error of much consequence on the part of the nosographers, to make symptoms the foundation of the science, instead of using them as *one* of the means by which to discover individual diseases. An anatomical foundation would in no way have lessened the importance of symptomatology and of semeiology, for, however substantial might have been the foundation of nosography, its superstructure could never have been built without proper methods of detecting and of expressing the characteristics of diseases. It is chiefly by the aid of symptoms and signs that individual

* "The London Medical Dictionary." London, 1809.

† The latest work of Sauvages (published a year after his death) contained a symptomatical, an etiological and an anatomical arrangement, but the etiological and anatomical were held in entire subordination to the symptomatical arrangement.

affections are recognized and species established, and it is from species that the superstructure rises.

While due consideration should be given to symptoms, it would, in the present state of science, seem unwise to attempt to make a *delineatio morbi* solely upon the basis of symptoms, for, without placing under contribution etiology and patho-anatomy, it would not be possible to fix a term for every circumstance in which the morbid conditions might vary. For example, in the case of a deformity, the description of its external characters would be insufficient and its definition inexact, if the cause and pathic properties were not set forth. This cause may be an injury, or a previous disease, or the deformity may be congenital. Again, an echmatic (ἔχμα, obstacle) affection may be owing to a congenital anomaly, to a previous disease, or to an injury. A tumor may consist of fat, or of muscular or fibrous tissue, of cartilage, or of bone, or of cellular elements which are rapidly proliferated, to be soon destroyed. In such cases, symptoms would indicate simply the existence of a tumor of a certain size and shape and its immediate effects, but not its anatomical properties. To make the description of an abnormal condition of the human body accurate and its definition exact, all the circumstances connected with it should be closely scrutinized and analyzed, whether they be external manifestations, or physical signs brought to light by the aid of certain tests systematically applied, as for instance, in the case of the sense of hearing in auscultation, of touch in palpation, or of other methods of physical exploration. At the same time the greatest importance should be attached to the causes and to the pathic properties of these conditions as revealed by the modern appliances for determining the anatomical and other characters of diseases, such as chemical tests, the electrical apparatus, the microscope, the polariscope, and other instruments of precision.

Cullen speaks of the difficulty he experienced in determining what is really a true species and what is only a variety, and finds it necessary to enumerate many varieties. This difficulty doubtless arose from his adopting a system based upon symptoms, rather than upon anatomy. Some of his rules for discriminating between species and varieties would now be of little value, and must have been very unsatisfactory in his own time. For instance, it could not have been easy to form a clear conception of what is "a symptom of a symptom," or "a symptom of a cause." The "symptoms of symptoms" have been defined as "effects which result from the symptoms of a disease, but which are not necessarily allied to the disease," and the following example is given: "thus, the debility which results from the frequency of the alvine evacuations in dysentery is a symptom of symptoms." All this has been handed down from the time of Cullen and seemingly accepted without demur or comment on the part of the profession, and recorded by such authors as Dunglison, Littré and Robin, and other writers of eminence. From symptoms, effects cannot arise, for symptoms are only manifestations of a morbid condition which is itself the effect of a cause. The idea of an effect arising from a manifestation is, therefore, most irrational. The debility which results from such phenomena as the frequent alvine evacuations in dysentery, is a consequence and not a symptom of the dysentery. The outward manifestations of dysentery are, the frequent bloody alvine evacuations accompanied by tenesmus. The analysis of these symptoms furnishes a sign upon which to base the diagnosis of the disease.

There are no "symptoms of a cause" any more than there are "symptoms of symptoms." The cause produces an effect—disease— which effect manifests itself by certain general or local symptoms.

Of late years, it has been proposed to employ two classifications and nomenclatures, one for the clinician, based upon the characters of the symptoms of the disease, and one for the pathologist, to be used in the autopsy room. Such a system would be entirely unnecessary, if a single classification and nomenclature were placed upon a proper foundation.

The modern botanical classification is based upon the reproductive organs of plants, that is, upon anatomy.

Zoölogical classification is likewise based upon anatomical characters, and this basis was adopted to a certain extent by Buffon, notwithstanding his general opposition to methodical arrangement, by Pennant, in his history of quadrupeds, published in 1781, and by other zoölogists of their time.

Looking at the inorganic world, it will be seen that the classification of minerals is based upon their chemical properties. The system adopted by the mineralogists includes classes, orders, species and varieties.

The chemical nomenclature of the present, the result of more than a century of arduous labor, is based upon the composition of compound substances, so that the name of a chemical compound generally indicates its exact composition.

All systematic studies of those sciences wherein the greatest advances have been made during this century, are established each upon a rational, a substantial basis, except medicine; and why the good example set by the naturalists has not been more generally followed by medical writers, it is not easy to explain.

A nosography based upon symptoms, cannot be accurate and must necessarily fall.

To be of practical utility, the classification of diseases should be based upon anatomy. This is the answer to the second question.

In this paper, therefore, an attempt is made to raise the superstructure of nosography upon this foundation.

### DESCRIPTION AND DEFINITION.

Summarizing what has already been stated as to the scope of nosography, it is found to include: (1) the description; (2) the definition; (3) the nomenclature; and (4) the classification of diseases.

*The description* of a disease is the setting forth, in detail, of its cause, nature, patho-anatomy and symptoms.

*The definition* of a disease is the statement of its peculiar, dominant and constant characteristics so concisely and clearly, that it can be readily recognized.

Description and definition are too often confounded. An exact definition, is the summary of an accurate description. It takes from such description only what is essential to precisely characterize a disease, and distinguish it from any other disease. An exact definition can, therefore, be deduced from the analysis only of a complete description.

In the description of a disease there may be symptoms, and other conditions, which are common to two, or to more than two diseases. To introduce such characters into a definition would vitiate and render it useless.

The methodical nosographer first describes a morbid condition. From this description he extracts the definition, and from the definition obtains the correct name of the disease, which he accordingly classifies.

### III. WHAT SHOULD BE THE CHARACTER OF THE NOMENCLATURE OF DISEASES?

*Nosonomy*,* or the nomenclature of diseases, is that division of nosography about which there is the least agreement among both the ancient and modern authors; consequently, of all scientific nomenclatures, that of medicine is confessedly the most defective. Of the many good rules prescribed for naming diseases, few have been observed, and many of the most absurd and meaningless terms anciently adopted, are still obstinately retained. A pernicious habit of inaccuracy among writers has been

* Nosonomy, from νόσος, disease, and ονομα, name. The words—know and name—are said to be traceable to the same root. Diseases, to be properly named, should, therefore, first be well known.

the outcome of this faulty nomenclature, which now proves to be one of the greatest detriments to the science and art of medicine. Although repeatedly pointed out, no concerted international action has been taken for the remedy of this evil. The nearest approach to reformation is indicated by the work done in the past thirty years, by the medical profession of the advanced European nations, more particularly of England. Most of the labor, however, was individual, and performed by the late Doctor William Farr, of London, who is entitled to the highest praise for his devotion to this section of nosography. He has done much to advance nomenclature, but there remains much more of the same kind of work to be accomplished.

Sir W. Aitken, who has also given great attention to the question of nomenclature, summarizes "the considerations which have generally regulated the naming of diseases" as follows: (1) some names have been taken from the part affected—*e. g.*, peri-pneumonia, podagra, ophthalmia, dysentery; (2) the most characteristic symptoms have furnished the name—*e. g.*, ileus, tenesmus, paralysis, diarrhœa, dyspnœa, coma; (3) some names have been taken from these two circumstances combined—*e. g.*, cephalalgia, otalgia, cardialgia, odontalgia, hysteralgia; (4) an alteration of tissue upon which subsequent changes depend, being recognized as the essential element of the disease, it is named accordingly—*e. g.*, pleuritis, peritonitis; (5) such alteration not being discovered, the first tangible link in the chain of causation has been used instead—*e. g.*, melancholia, cholera, typhus; (6) when a lesion tending to sudden death at once follows the application of a cause, that cause may name the disease—*e. g.*, lightning, prussic acid, arsenic, scald, sunstroke, cut, stab, frost-bite, etc.; (7) a considerable number of names of diseases have been derived from some imaginary resemblance to external objects—*e. g.*, elephantiasis, cancer, polypus, anthrax, etc.; (8) there are still many names the origin of which it is not easy to trace.'

Faulty as are these and many other terms, it is extremely difficult to fill their places with suitable expressions. That this will in time be accomplished—perhaps, however, not until two or three generations of physicians shall have passed away—is reasonably to be anticipated. Meanwhile, it is to be hoped that during the present generation, good substitutes will be offered for such caconymous terms as podagra, rheumatism, apoplexy, melancholia, ileus, dysentery, diarrhœa, cholera, typhus and typhoid fevers, variola, diphtheria, hydrophobia, elephantiasis, lupus, leprosy, anthrax, cancer, chancre, chancroid, scrofula, syphilis, and a host of other equally inappropriate names of diseases.

Many of these terms are used in this essay—but under protest—until, by general agreement, correct terms shall be substituted.

"The perfection of a science depends, in no inconsiderable degree, upon the perfection of its language; and the perfection of every language upon its simplicity and precision."*

The language of medicine should be euphonious, simple, expressive and accurate, for its object is not only to describe and define diseases with precision, but to mirror the medical experience, wisdom and genius of the past as well as of the present. Nosographical nomenclature is the most important part of medical language, and consists of the technical terms therein used. This nomenclature should be based upon the structural characters of the affections of the human body; therefore, the names given to diseases should convey to the mind an exact idea of the morbid conditions which these names are designed to express—at least a strong endeavor should be made toward the attainment of that end. As a general rule these names should be Latin or Latinized Greek, or of Greek or Latin derivation, but should not be compounded of Latin and Greek. To avoid confusion, it is desirable that one name only be adopted for each

* John Mason Good.

individual disease. When a disease already bears several names, if one of these be accurate, it should be adopted, to the exclusion of the superfluous or improper names, otherwise a correct term should be coined, and the other names should be placed under the head of equivalents, synonymes, or caconymes, as the case may be.

The names of men applied to diseases are extremely objectionable, convey no idea of the nature of these diseases, and even fail to flatter vanity. It happens sometimes that a disease bears the names of two persons whose description thereof is the same. May it not also happen, that one and the same disease is very differently described by two or even three persons, each giving his name to the disease, so that two or three diseases may be enumerated where only one exists? The resulting confusion and perplexity would, in such a case, be most discouraging to earnest students. The fashion of giving men's names to diseases has continued through so long a series of years that it has grown into a confirmed and mischievous habit. If this sentimental, but mistaken notion of honoring or of rewarding merit could have been limited, no great harm would have ensued. The evil is, however, already an offensive blot upon the nomenclature of medicine, and threatens to mar the best pages of medical literature. Will it not be a most agreeable relief to the senses of the heedful reader, when authors shall have banished from their treatises such terms as Addison's disease, Basedow's disease, Bright's disease, Charcot's disease, Dupuytren's contraction, Graves' disease, Hodgkins' disease, Ménière's disease, Pott's disease, and very many more of kindred names, which express no notion of the nature of the affections bearing such pseudonymes?

The names of regions of country—*e. g.*, Barbadoes leg; of animals—*e. g.*, lupus, elephantiasis; of vegetables—*e. g.*, hay fever; of some of the elements—*e. g.*, St. Anthony's fire; and other names, too absurd and too numerous to particularize, have been given to diseases.

The same faulty nomenclature exists in the fundamental science and associated arts of medicine.

It is to be hoped that the much-desired general reformation in medical nomenclature will soon begin, but the bad foundation must first be sapped by a radical change in the nomenclature of the fundamental science and associated arts of medicine.

The answer to the third question is that the nomenclature of diseases, to be exact, should be based upon the true nature of morbid conditions, and should be characterized by simplicity, brevity and accuracy.

### IV. WHAT SHOULD BE THE METHOD OF THE CLASSIFICATION OF DISEASES?

*Nosotaxy, or the Classification of Diseases.*—The fourth division of nosography relates to the grouping of those diseases that have been described, defined and named, and to their arrangement into distinct classes, orders, genera and species. This is called taxonomy* or classification.

Next to nomenclature, classification has exhibited the most diversified and incongruous views. At the close of the last, and in the beginning of this century, classification was in such fashion that every prominent physician thought himself bound to construct a new classification of diseases. The result was that no two systems agreed; and that nearly all classifiers not only repeated the heresies of their predecessors, but often made greater mistakes, so that nosography soon fell into disrepute and contempt. The excessive zeal displayed by many of these classifiers in endeavoring to promote nosography, and their premature publication of imperfect and ill-digested systems, are among the main causes of the retardation of its progress.

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* Taxonomy, from τάξις, arrangement, and νόμος, a law; and, for the sake of precision and brevity, nosotaxy, the classification of diseases.

Sir W. Aitken, in his warm advocacy of methodical arrangement, predicts a glorious future for nosography.

He says, under the head of "principles of classification:"—

"A perfectly philosophical or natural system of classification, aims at having the details of its plan to agree in every respect with the facts as they exist in nature, and to be, as it were, a 'translation of the thoughts of the Creator into the language of man.' To effect this end, arrangements, as they naturally exist, require to be traced out, not devised. The tracts in which our knowledge is as yet deficient, may be shortly indicated under the following heads: (1) The affinities or alliances of diseases with each other; (2) the morbid anatomy of diseased parts; (3) the communication, propagation, inoculation, generation, development, course and spontaneous natural termination of diseases; (4) the connection of the phenomena recognized during life with the facts of morbid anatomy; (5) the geographical distribution of diseases; (6) the succession of diseases, so far as they can be traced through past ages; the peculiarities they have exhibited at different periods in the world's history, or within comparatively recent cycles of years." "But," he further says, "the time has not yet come for a classification on a basis so comprehensive—simply because the material does not yet exist; and attempts to make so-called natural systems of arrangement, must end in disappointment, on account of the uncertain and fluctuating data on which they must be based."

It is true that the whole of the material does not yet, and may never exist for "a perfectly philosophical or natural system of classification," but there is enough good material at hand, which, if wisely used, will greatly improve the present system of classification. It surely is not the part of wisdom to wait an indefinite time to begin this work. Had the early nosographers waited for the "proper time to come," this science would, to-day, scarcely be in existence. But they quickly made use of such material as was then at hand, and their labors have led largely to the advances which are at present enjoyed. The succeeding generations of nosographers will doubtless profit by the good work—and by the errors, too—of the preceding, and it may possibly be many centuries before the fond hope of Sir W. Aitken can be realized, but the beginning should be made now.

The task of improving the classification of diseases may be begun by individuals; but individual labor should, with good grace, be submitted to the criticism and correction of other individuals and of organized associations of the medical profession, first of the country of these individuals, then of all countries of the world.

The study of the nosography of the past, showing, as it does, such great diversity in the many systems, such lack of agreement among the nosographers, such confusion in classification, and such eccentricity in nomenclature, must needs lead to the conclusion that it is not possible, in the existing state of medical science, for any one person, or for a single association, or even for the medical profession of one, or of several nations, to produce a complete general nosography. The unsuccessful efforts already made in this direction, for the past century and a half, are good evidences of the correctness of this proposition. Many individuals may each prepare the nosography of one apparatus of the human body, and thus, doubtless, give substantial aid in the cause of nosography, and contribute thereto much valuable material; but, in view of the progressive character of medical science, the details of all such work must, necessarily, be provisional, and constantly subjected to alterations and revisions. The final decision of questions relating to the general principles of nosography, and tending to make the nomenclature of medicine uniform in all countries, should be made by an assembly of representative physicians of all nations, through international conferences, so that every individual member of the medical profession may know that his voice has been heard for or against the adoption of any proposed method of nomenclature

and classification of the diseases of man. By this means only, can a comprehensive system of nosography be compiled, which will be of practical utility to all nations for the purposes of vital statistics, and of the medical reports of armies, navies, and general hospitals, or for the use of students, teachers and investigators.

The answer to the fourth question is, that the excellent method of classification, borrowed from the botanists by the early medical classifiers, should be re-adopted with the modifications indicated below.

If the majority of the medical profession of the *world* should decide in favor of classifying the diseases of the human body, as heretofore, like systems of botany, it would seem rational to base the classification upon anatomy in its broadest sense; and such a basis is the one which offers the greatest advantages and the widest scope in theory and in practice. A knowledge of the gross appearances, and of the construction and relation of the several parts of the body, of the minute structure of the tissues and organs, of the development and abnormities of the organs, of the functions of the apparatuses, and of the nature and morbid conditions, is of the utmost importance. Nay, more, a mastery of these various branches of anatomy, is essential to the study of the natural history of diseases. By its aid, all deviations from the normal state of the body, or any part thereof, are at once recognized. It remains only to differentiate these abnormal conditions, and to define, name and classify them. These, it seems, are sufficient grounds for the adoption of the anatomical basis for the nosography of man. It is, therefore, suggested that all diseases, injuries and congenital abnormities be grouped into families, one family for each apparatus of the body, and one, or more than one family for general diseases. Some of the families should have two, or more than two branches, and families and their branches should be divided into classes, orders, genera, species, sub-species, varieties and sub-varieties.

It is of the utmost importance that, in the medical profession, there be a consense of views concerning not only nomenclature and methodical arrangement, but also of the use of the terms of classification. Notwithstanding the fact that the early nosographers indicated, as best suited to the purposes of nosography, the simple arrangement of diseases into classes, orders, genera, species and varieties, the most recent of the modern medical classifiers begins with classes, and after orders, introduces "sub-orders, tribes and families," next to which he places genera, species and varieties. Such a method only leads to confusion, complication and uncertainty. Similar methods have been tried in medicine, and found wanting in clearness and accuracy.

The plan proposed in this work does not include sub-orders, or tribes. Families are applied to the groups of diseases dwelling in the apparatuses of the body.

The nosographer who lays before the profession a system of classification, is in duty bound to give an exact definition of each and every term of classification which he employs, in order that he may be rightly understood.

Only those terms of classification that are approved by the medical profession should be used in a special, or in a general nosography.

The sooner the question of method is put to a vote, after free discussion in an association representing the medical profession of the whole world, the better it will be for the cause of accurate nomenclature and classification.

Therefore, the following questions are suggested for discussion at the *Tenth* International Medical Congress :—

1. Shall there be instituted an international system of nomenclature and classification of the diseases of man?
2. If so, what shall be the basis of this nomenclature and classification?
3. What shall be the character of the nomenclature?
4. What shall be the method of the classification?
5. What shall be the nature of the terms used in the classification?

6. Shall these terms be defined?

In case the first question—Shall there be instituted an international system of nomenclature and classification of the diseases of man?—be decided in the affirmative, it is further suggested:—

1. That the International Medical Congress establish a permanent Section on the nomenclature and classification of the diseases of man, to be composed of physicians and surgeons representing the medical profession of all nations.

2. That all national medical associations likewise establish (each) a Section on the nomenclature and classification of diseases, composed of physicians and surgeons representing different regions of country, in order that their knowledge of the peculiarities presented by disease in different climates may be made available in the work to be accomplished.

3. That State, city, and special medical associations, through their presiding officers, each appoint a committee on the nomenclature and classification of diseases. This can be effected without, in any way, deranging the machinery of these associations.

4. That the city and special associations, report to the State associations, such action as they may take upon the proceedings of their committees.

5. That the reports of the city and special associations be embodied in the report of the State committee, and the consolidated reports be presented to the State association for action and transmission to the national association.

6. That the national association refer the State report to the national Section on nomenclature, etc., for a report, after careful examination and free discussion; the report to be acted upon by the national association and forwarded, or presented by a delegate, to the Section on nomenclature and classification of the International Medical Congress.

7. That the Section on nomenclature and classification, of the International Medical Congress, then revise the several national reports, consolidate them, and present their conclusions to the Congress, whose decision thereon should be final.

These suggestions are made in the belief that they point to a fair method of obtaining the views and the vote of the whole medical profession on a subject of the vastest importance to mankind, and also to the most expeditious way to attain the desired end of compiling a uniform nomenclature and classification of diseases that may be of practical utility to all nations.

### DEFINITIONS OF THE TERMS OF CLASSIFICATION.

The following definitions of the terms of classification are modeled upon botanical nomenclature, except those of family, class and order, which do not here occupy the same relative positions as in works on Botany and Zoölogy:—

1. *Families of Diseases.**—A family is a group of diseases dwelling in an apparatus of the human body and affecting, in a greater or less degree, the organs of this apparatus and, consequently, its function. Therefore, affections of the organs of an apparatus, and also general diseases affecting several apparatuses at once, should be grouped into families.

2. *Branches of Families.*—A branch of a family of diseases, is a division of the family predicated upon affections peculiar to the sex; as in the case of the family of affections of the uro-genital apparatus, which should be divided into two branches: (1) andrology, (2) gynæcology; or upon the affections of an apparatus which includes two, or more

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* Family, from *familia*, a family, and *famulus*, a servant, and δμιλια, an assembly, and the Hebrew word which means to labor, is the most general term, being those who are bound together upon the principle of dependence.

Family includes in it every circumstance of connexion and relationship. (*Crabb.*)

than two, subsidiary apparatuses, as in the case of the cephalo-rachidian, nutritive and cutaneous apparatuses.

3. *Classes.**—A class of diseases is ordinarily defined as a division of diseases grouped together on account of their common characteristics. In this case, however, the term class is used to signify a group of diseases which, though possessing different characteristics, affect a particular organ. In this system, therefore, the classes have reference to, and bear the anatomical denomination of, the organs of an apparatus.

4. *Orders.*†—An order is an association of genera, or a group of the general morbid conditions of allied affections of particular organs. The orders, therefore, refer to the general denomination of the morbid condition of the organs of an apparatus.

5. *Genera.*‡—A genus is an assemblage of species possessing certain characters in common. The genera, therefore, refer to the particular denomination of the morbid condition of the organs of an apparatus.

A single species having distinctive characters that seem of more than specific value may constitute a genus.

6. *Species.*§—A species is a permanent series of similar individual affections associated on account of their common properties. These properties are to be determined only by the closest observation of abnormal conditions of the human body. Species, says Cullen, "are ready made by nature (he would have been more exact had he said, the individual diseases which constitute species are ready made by nature); the nosographer has only to discover and name them, but the orders and genera he must construct —not according to fancy, but to reason and to definite rules. Species are, therefore, named in accordance with the general specific properties of the affections of the organs of an apparatus.

7. *Sub-species.*— A sub-species is a subordinate species, possessing distinctive characters that are of more specific value than those of a variety. On this account it occupies a middle position between the species and the variety.

8. *Varieties.*‖—A variety is a form of species possessing peculiarities that differentiate it from the typical characteristics of the species. The varieties are, therefore, named in accordance with the particular specific properties of the affections of the organs of an apparatus.

9. *Sub-varieties.*—A sub-variety is a subordinate variety or a division of a variety. It may indicate morbid properties differing in their characteristics from those typical of varieties, or may indicate the special cause of the affection. The sub-varieties, there-

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* Class, from *classis*, very probably from the Greek κλάσις, a fraction, division or class. Class is more general than order. "Classification is a branch of philosophy which is not attainable by art only; it requires a mind peculiarly methodical by nature, that is capable of distinguishing things by their generic and specific differences; not separating things that are alike, nor blending things that are different." (*Crabb.*)

† Order, from *ordo*, from ὄρχος, a row, which is a species of order, is applied to everything which is disposed. The order lies in consulting the time, the place and the object, so as to make them accord. (*Crabb.*)

‡ Genus, from *gignere*, from γένειν, to engender, "is a class of objects, divided into several subordinate species." (*Webster.*)

§ Species, from *spicere*, to behold, signifies literally the form or appearance, and in an extended sense, that which comes under a particular form. Species is a term used by philosophers, classing things according to their external or internal properties. (*Crabb.*)

‖ Variety, from *varius*, which probably comes from *varus*, a speck or speckle, because this is the best emblem of variety. Variety seems to lie in the things themselves. A variety cannot exist without an assemblage. Variety strikes on the mind, and pleases the imagination with many agreeable images; it is opposed to dull *uniformity*. (*Crabb.*)

fore, relate partly to the special character, and partly to the etiology of the affections of the organs of an apparatus.

10. *Symptoms.**—A symptom is a manifestation of disease. It is perceptible to the senses, even of the patient.

11. *Signs.*—The sign of a disease is the indication of its presence. It may be (1) a sign *per se*, indicating disease apart from symptoms, or (2) an inferential sign deduced from the analysis of a symptom, or of a group of symptoms.

The symptoms and signs, without which accurate classification would be impossible, serve to detect individual diseases and establish species, and from the species the classification is constructed, for out of them spring the genera and the orders, the varieties and the sub-varieties. Therefore, the position of symptoms and signs is next in order to the foundation stone of nosography.

Symptoms of diseases, being their manifestations, or those phenomena which are apparent to the senses of the observer or even of the patient, differ very materially from the signs, these being deduced from the analysis of the symptoms. Therefore, the symptoms are noticeable by anybody, but unless rightly interpreted are generally of little value. It is only the wise and experienced physician, after analyzing a group of symptoms and properly interpreting them, who can perceive what is correctly termed the sign of a disease.

## CONCLUSIONS.

Among the conclusions drawn from the preceding considerations are :—

1. That the systematic arrangement of diseases has given medicine an assured position among the sciences, and has contributed marvelously to the advancement of medical art during this century.
2. That the only stable basis for nosography is Anatomy.
3. That an accurate description and an exact definition of diseases are essential to a precise and practical nosography.
4. That a nomenclature, to be satisfactory, must not admit the application of the names of men to diseases, or any name which does not convey an intelligible idea of a morbid condition.
5. That the nomenclature of diseases can be much improved only, after a very great change for the better shall be made in the nomenclature of the fundamental science and associated arts of medicine.
6. That the most useful and practical classification of diseases is that in which these are grouped, in accordance with the apparatuses of the body, into families, branches of families, classes, orders, genera, species, sub-species, varieties and sub-varieties.
7. That the purpose of the nosographer should be to guide the practicing physician to the end of any case of disease.
8. That a complete nosography should include the history, patho-anatomy, diagnosis, prognosis, and treatment of diseases ; and, for ready reference, should contain not less than five synoptical tables : (1) a synopsis of the morbid states and morbific processes of the body ; (2) a synopsis of the genera and species of diseases ; (3) a synopsis of the classes, orders, genera, species, sub-species, varieties and sub-varieties of diseases ; (4) a synopsis of the aetical factors of diseases, and (5) a synopsis of the symptoms and signs of diseases ; also a full alphabetical index.
9. That any system of general nosography, to be of utility to scientific investigators, practicing physicians and vital statisticians, should be the result of the conjoint labors of the medical profession of all the civilized nations of the world.

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* Symptom, from συν, with, and πιπτειν, to fall. To fall in with. Any perceptible change in the human body.

DEBATE.

Dr. BONTECOU, of Troy, N.Y., stated that he had not the pleasure to hear all of Surgeon Smith's paper this morning, but, from the information gathered by the charts* before us, he is favorably impressed with the nosological arrangement in use in the Prussian army, having only fourteen divisions, and appears to be as comprehensive and descriptive as those now in use in the United States army, and in the British army, which are much more complicated, having nearly fifty divisions and subdivisions; and, as simplicity and conciseness are very desirable and important in the military service, he should think *that* form, or one similar to that in use in the Prussian army, desirable for our service.

Dr. SIMEON TUCKER CLARK, of Lockport, N. Y., said: When, in my youth, I was taught the natural sciences, I was greatly impressed with the assistance which a definite nomenclature afforded me. The name of a flower, a shell, a mineral, a fossil, when once learned, gave more than a hint to its general characteristics, and sometimes was so completely definite, that the name suggested its nature and place in the world. This was long before I knocked at the door of the Temple of Esculapius, and when I entered these sacred portals, I expected to find Medicine a science, as well as an art, but the faulty nosology and its deficient nomenclature was a stumbling block. The name of the musical mosquito that tormented my patient, the flea or bedbug that annoyed him, had its place definitely settled in natural history; but the disease which was rapidly taking my patient—a man, the noblest work of his Creator—to that bourne from which no traveler returns, was without form or suggestion. The messenger who called me said: "My father has *the* fever;" when I arrived I saw at a glance that the patient had fever, but the attendant gave me little more information when he declared that it was typhoid fever; for we were sure that, whatever the type of fever, if it went on to a fatal termination it would finally be typhoid or sinking. There is but one basis of nomenclature that is of value, and that is, as Dr. Gouley has so succinctly informed us, such as relates to patho-anatomy, and makes the name descriptive of the changed condition. I hope the entering wedge has been placed, and that the blows of succeeding workers will drive it to a successful end.

Dr. DIDAMA, of Syracuse, N.Y., rose to commend the paper of Dr. Gouley, which is an effort for reform in nosology, made none too soon. Looking at the chart of the nosographical system followed by the U. S. army, we can hardly believe that it would be adopted to-day. The trend of modern thought and investigation is to strike out some of the orders of the chart, and to re-arrange several of the others. Class 3d—Parasitic Diseases—might well include Orders 2 and 3 of Class 2; Tubercular diseases and Diathetic diseases—even if we do not strike out Diathesis entirely from nosology. So Zymotic diseases, including Miasmatic, may hereafter also be included in the Parasitic.

Dr. HYDE, of Cortland, N.Y.—I only wish to say that the learned paper just read by Dr. Gouley has touched the key note of this important subject in the proper place, to wit, in the International Medical Congress now in session. It is wrong, when the medical profession is achieving so much, that it should not establish a classification of diseases, which should be appropriate and of definite interpretation.

Dr. HINGSTON, of Montreal.—There is evident necessity of revision, but the difficulty is, how to effect it. Nosological tables have been adopted by the various governments and armies of the world. None of them approach—perhaps it is not in the nature of things to approach—perfection. The work of governments is some-

* These charts being reprints, were not introduced here.—H. H. S.

times put aside by State and Provincial Boards of Health, which think themselves fully competent to construct their own. International action is most advisable, and in that direction a movement should be made, as suggested by Dr. Gouley. But with medical nomenclature, the case is different, and it should be the duty of medical and surgical writers to discard—utterly discard—the attachment of names of individuals to any medical or surgical ailment. Nomenclature of that kind is unscientific, misleading and fatiguing to the memory.

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## THE ETIOLOGY AND TREATMENT OF TETANUS.

### DE L'ÉTIOLOGIE ET DU TRAITEMENT DU TÉTANOS.

### ÜBER ÄTIOLOGIE UND BEHANDLUNG DES STARRKRAMPFES.

BY CHARLES W. BROWN, M. D.,

Of Elmira, N. Y.; Surgeon to Delaware, Lackawanna and Western Railroad, etc.

Traumatic tetanus must depend upon other conditions than the injury itself, as a large number of cases may occur where the injury is identical, as regards location, severity, and manner of production, with the surroundings nearly the same, and but one of this number suffer from tetanus, while all the rest show no sign of the disease.

If the irritation set up in the peripheral distribution of a nerve and conveyed along that nerve to the spinal cord, excites, by reflex action, the muscles near the injured nerve to a state of spasm, why is it that the disease does not make its appearance sooner after the receipt of an injury? The symptoms which characterize this affection are undoubtedly referable to an abnormal influence of the nervous centres which control the action of the voluntary muscles.

If Rosenbach's theory is correct, that traumatic tetanus is caused by a characteristic bacillus, which, when transferred to animals, produces the same symptoms as in man, why is the disease more frequently met with after the receipt of punctured wounds, where there would be less liability to the danger of the admission of septic germs, than in cases where there is a large amount of open wound exposed to the air, and where extensive suppuration takes place? The writer would incline to the belief, that the morbid influence which produces tetanus, is first developed at the seat of the wound, and conveyed, through the circulation, to the nerve centres. If there is a characteristic bacillus, it either enters the wound with the instrument producing it, or develops after the receipt of the injury, from the presence in the system of certain conditions favorable to its development; and, as far as we have been able to observe the exciting cause in traumatic cases, the instrument producing the wound has been such that a poison was, probably, conveyed beneath the tissues when the injury was created, the greater number, both in man and animals, being produced by the puncture of a rusty nail, wad of a toy pistol, or machine injury; wounds that would not admit of the discharge of foreign bodies, or pent-up fluids.

That this disease is due to ascending neuritis, finds support in the congested and inflamed state of the nerves leading up from the place of injury, and in the inflammatory changes discoverable in the cord and its vessels, though, many times, thorough

investigation by experienced observers has altogether failed to detect any alterations in the nerves or pathological changes in the cord, other than those that might properly be attributed to the spasms, the temperature, or the drugs administered.

The evidences of inflammation of the cord are most apparent, not in the portion of it into which the nerves from the wounded part enter, but, as shown by Michaud—so far as the cellular changes in the gray matter are concerned—always in the lumbar region, no matter where the wound may be located.

The more generally-accepted theory of reflex neurosis is based upon the association of the disease with all forms of nerve irritation, pathological, mechanical, thermal, and chemical; upon the direct relation existing between the likelihood of its occurrence and the degree of sensibility of the wounded nerve; in the—at times—very short interval between the receipt of the injury and the commencement of the tetanic spasms; in the local spasms, unquestionably developed by nerve pressure and injury; in the primary affection of the muscles at a distance from the damaged part; in the absence of structural lesions of inflammation; and in the relief at times offered by the removal of irritating foreign bodies, the temporary cutting off of the nerve connection with the central organs, or the amputation of the injured limb. But, that something more than irritation of peripheral nerves is necessary to the production of tetanus, would seem to be proved by the frequency of such irritation, and the rare occurrence of the disease.

The so-called humoral theory would find the exciting cause of the disease in a specific morbific agent, developed in the secretions of the unbroken skin, or the damaged tissues of the wound, or introduced from without and carried by the blood to the medulla and the cord, there to produce such cell changes as give rise to the tetanic movements. It finds support in the unsatisfactory character of the neural theories; in the strong analogy, in many respects, of the symptoms of the disease with the increased irritability and muscular contractions of hydrophobia and strychnia poisoning, or those produced by experimental injections of certain vegetable alkaloids; in the recent discoveries in physiological fluids, as urine and saliva, of chemical compounds, and decomposing organic matter of ptomaines, capable of tetanizing animals when injected into them; in the rapidly-enlarging number of diseases known to be, or with good reason believed to be, consequent upon the presence of peculiar microbes; in the more easy explanation by it than upon other theories of the ordinary irrregularity and frequency of its occurrence, its occasional restriction within narrow limits, and its almost endemic prevalence in certain buildings, and even beds; in the extreme gravity of acute cases, and the protracted convalescence of those who recover from the subacute and chronic forms; in the very frequent failure of all varieties of operative treatment, and in the success of therapeutic measures just in proportion to their power to quiet and sustain the patient during the period of apparent elimination of a poison, or the development and death of an organism.

Tetanus is a specific infectious malady, the development of which is never spontaneous, and is due to something affecting the patient himself, and not directly to the form, extent, or location of a wound.

Prof. Rosenbach's theory, is to the effect that traumatic tetanus is caused by a characteristic bacillus, which, when transferred to animals, produces the same symptoms as in man. The disease had been observed in hospitals and on the battle field, and had generally been attributed to neglect. From a patient in the Göttingen Clinic, Prof. Rosenbach took some gangrenous matter and inoculated it upon a number of rabbits and mice; the next day these animals died from tetanus in a few hours. The same result followed further experiments, and Prof. Rosenbach then tried to make pure cultivations of the infective matter, and, among various microörganisms, he found a peculiar bristle-shaped bacillus. This bacillus, Rosenbach considered to be the cause of tetanus, and described its effects in this way: from the point of inoculation the

poison spread through the blood vessels to all parts of the body, each bacillus producing a poison similar to strychnine, which caused the tetanus. Rosenbach did not consider the investigations on the subject by any means concluded, and believed that many objections would be raised against his views.

In the month of July last, I took some blood from the neck of a young horse (five days after he showed symptoms of tetanus following castration, and dead eleven days from the commencement of the disease), and injected a few drops of it into the thigh of a kitten, after which it refused to eat, and was restless for two hours, and then appeared to be sleeping, but when aroused would cry out, and was unsteady on its feet; twelve hours after it still kept very quiet, but when it was disturbed had convulsions, and would lie on its side, with the jaws firmly closed, though after the convulsion ceased it opened its mouth slightly; it rapidly grew weaker, and the convulsions were more frequent, and it died twenty-five hours from the time the blood was injected.

No pus formed at the point of inoculation, but a slight congestion marked the spot; other experiments with the same virus gave the same results.

It is quite generally admitted that tetanus is contagious, and, in support of this theory, the writer noted the similarity between the symptoms of tetanus, and a large number of cases of cerebro-spinal meningitis, during an epidemic in Tioga county, Pennsylvania, in the winter of 1872–3; nearly all these cases had convulsions. One case, a boy four years of age, was unable to open his jaws, or to swallow any fluid for seven days, and his food and medicine were given by the rectum. For three days and two nights, opisthotonos was constant, so that his head and heels touched, and the muscles did not relax sufficiently to allow him to lie straight in bed for ten days. After a long, tedious convalescence, he recovered, but is a deaf mute, though he seems intelligent, and is well advanced in his studies at school. In five fatal cases, during this epidemic, four died within four days from the attack, and the other at the end of the second week; in all cases there was a stiffness of the jaws, opisthotonos being a marked symptom, which continued until death. None of them could swallow food or medicine, neither could they open the jaws, for more than twenty-four hours preceding death. In three, the mind seemed undisturbed, except occasionally they were seized with a terrible fear that some one was going to harm them, or that they were trying to escape from some terrible danger. This delirium did not last more than half an hour at a time; then, after it, they would drop into a sort of stupor lasting for an hour or more, and then seem rational for a few hours. In the other fatal cases, delirium was constantly present, and was one of the first symptoms of the disease. The post-mortem appearances in two of these cases were similar, and as follows: rigor mortis continued for a long time, skin showed remains of numerous petechiæ, the inner surface of the dura mater was specked with blood, hyperæmic and adherent to the arachnoid, with a small amount of sero-purulent infiltration of the arachnoid and sub-arachnoid space in the brain and spinal cord.

It is a difficult matter to determine, in cases of so-called idiopathic tetanus, whether it is truly a case of the disease in question. Sometimes the case progresses for a long time, with various symptoms of only nervous disorder, until, finally, the symptoms assume a very grave character, and only gradually develop symptoms resembling tetanus. In a case which came under my care last October, the patient, an estimable, intelligent lady, 55 years of age, the wife of a minister, had been in poor health for a number of years, and her principal complaint had been indigestion and nervousness. When I first saw her, the husband and daughters told me she had been acting strangely, and declared that she could not sleep, and, when she had just wakened from a sleep of three or four hours' duration, would declare that she had not slept a minute for the past week. The tongue was very red, and she would keep her head covered when any one

was present. The following symptoms made their appearance during the progress of the disease: the temperature did not rise half a degree above the normal, the pulse was from 80 to 85 per minute, full and quite regular; she declared that she would suddenly become unable to talk, then complained of difficulty in swallowing, but when fluids were placed in her mouth, they would pass down without particular difficulty. A few weeks later, when she attempted to swallow, the effort caused spasm of the muscles of deglutition; soon after this she complained of stiffness in the muscles of the jaws, and, when she was requested to open her mouth, was unable to do so without the aid of her hands, and then only sufficiently to admit the finger tips. This rigidity increased so, that in a week more she was unable to open her mouth, or to swallow any fluid; for twenty days her nourishment and remedies were administered per rectum, as her jaws were firmly held together, and, when a fluid was allowed to trickle back into the throat, it would produce violent convulsions. The muscles of the back were not more affected than the other muscles of the body and limbs; those of the jaws and neck being the only ones that remained permanently contracted until death, which occurred on April 11th.

There was no indication or history of a wound of any description. Permission to make a post-mortem was not granted.

If it be admitted that the tetanus of the horse is infectious—as many recent experiments would seem to show— it must be admitted that tetanus of man is the same.

Now, the contagiousness of tetanus in the horse is quite generally admitted, as is shown by the cases of Larger, presented to the Sociètè de Chirurgie, and by the observations of Cérémini, who states that, at Noise-le-Sec, tetanus has been endemic from time immemorial. All horses wounded within a radius of several leagues from it, died of tetanus. It has been estimated that one and a quarter per cent. of the horses of Noise die of tetanus. In a village of Ardennes, a veterinarian castrated thirteen horses on the same litter, and they all died of tetanus. In a neighboring village he operated upon ten others, who also died. In Elmira, N. Y., eight horses have died of traumatic tetanus within the last year, two in one stable, and nearly all of them in one district of the city.

Tetanus following extensive laceration of nerves. October 26th, 1885, C. W. A., slight-built, muscular man, aged 27 years, temperate habits; while at work running a large planer, the sleeve of his shirt caught in the feed cogs, and tore off all the soft parts of his arm and forearm, from near the hand to the insertion of the deltoid, tendons, muscles, nerves, arteries and veins, clean to the bone, leaving but a narrow strip on the back of the arm that was not lacerated; the brachial, radial and ulnar arteries were torn away, and the median, radial and ulnar nerves lacerated and their broken ends ground up to pulp. He was brought to my office, and amputation was urged as the only possibility of saving his life. This was refused. The wound was cleansed as well as possible, the shreds of crushed tissues removed by the scissors, the brachial artery was ligated at its upper third, the ends of the wounded and broken nerves were cut off close, and the wound bathed with a solution of hyd. chl. cor., one part to 1000, then closed as well as the scanty amount of tissue would permit without any overstretching of the skin; then a compress was applied and held in place by a roller-bandage. He was taken to his home, and his mother, a widow, was urged to use her influence to have her son consent to an amputation; this she refused to do, and insisted that his arm must be saved; so we turned our attention to conservative measures. Opiates were given to control pain, the arm was placed in a proper position to admit of drainage; the patient in bed, in a well-ventilated room; the hand was wrapped in warm, dry flannels, frequently heated, but during the night and all the next day the hand was cold and pale; he suffered but little pain. On the morning of the 27th his temperature was normal, the pulse 90, very small and threadlike; he said his hand had no feeling, and that his arm felt heavy; toward evening his temperature was 100, and

pulse a little stronger, 98; said he felt better and seemed hopeful. 28th, 8 A. M. He slept some through the night; pulse 99, temperature 101; he passed urine twice during the night, but with some difficulty.

The bandages were somewhat soaked through, and were all removed; the crushed muscular tissues were dark colored, and were somewhat offensive. The arm was thoroughly cleansed with a solution of carbolic acid, and dressed with lint loosely applied, and kept constantly wet with carbolized water. At evening his pulse went up to 105, and temperature 102.

29th, 8 A. M. He was more restless during the night, complained of pain in the pit of his stomach, which at times was very severe; no stiffness in his jaws, pulse 110, temperature 102¼. On dressing the arm found it enormously swollen, the hand and wrist œdematous, but warm; portions of the crushed muscle beginning to slough; dressed with a warm flaxseed poultice, containing powdered charcoal, and changed every six hours. At 8 P. M., pulse 109, temperature 102½. 30th, 8 A. M. Slept a little during the night, after taking full doses of morphia; pulse 118, temperature 103¼; arm still greatly swollen. He says the poultices make it feel more comfortable; has not passed urine since yesterday afternoon; a pint and a half of high-colored urine was drawn off with the catheter. 9 P. M. Pulse 120, temperature 104; swelling and redness extending up on the body. On removing the poultice there is a slight discharge of watery pus. 31st. Pain in pit of stomach increased; pulse 118, temperature 103¾, nervous and restless; discharge from the wound more free, and the sloughs begin to loosen. Give 20 gr. potas. bromide every four hours, also 15 drops tr. ferri. chl. and quinia sul. every six hours. 8.30 P. M. Pulse 128, temperature 104½, discharge profuse, large sloughs came off with the poultice, considerable hemorrhage when the arm was raised up to dress it, which was controlled by hot water; has less pain in his abdomen, and is less nervous. Nov. 1st, 8 A. M. Pulse very weak, 120, temperature 104; very large quantities of offensive-smelling pus, and numerous large sloughs, come off with the poultices; some of them were held fast by tendons, or vessels, and were cut loose with the scissors. 7.30 P. M. He complains of feeling very weak, and cannot swallow without a sensation of constriction, and has stiffness in his jaws, and opens his mouth with difficulty.

2d, 9 A. M. Pulse 115, temperature 109; the hand is but slightly swollen, the sloughs have all come off, healthy granulations are springing up all over the surface of the wound, and the poultices are discontinued and carbolized linseed oil used instead. 8.30 P.M. Has been very comfortable through the day, though the pulse is 130, temperature 103½; increased stiffness in jaws. 3d. Pulse 122, temperature 102¼; catching respiration, very painful on full inspiration; urine was drawn with catheter.

4th. Has darting pains all over him, so that he is unable to sleep. 5th. When he attempted to take a drink of water, he was seized with a spasm of the muscles of his back, neck and jaws. Chloroform was administered, which relieved the convulsion; the bromide was increased to 30 grains every hour, but, as soon as the effects of the chloroform had passed off, the convulsions returned, so chloroform was used frequently. Nourishment and stimulants were given freely, by the mouth, and enemeta, but he rapidly grew weaker, and died on the evening of the 6th. His mind remained clear until the last.

Dr. George W. Avery, of Norwich, N. Y., reports a case as follows: M. G., laborer, Irish, aged 34, strong healthy man. July 7th, 1869, while returning from work, jumped from a flat car, and landed in the bottom of a cattle guard, producing compound comminuted fracture of the right leg (Pott's fracture), the lower end of the tibia being badly comminuted. Saw the patient within one hour after injury. Shock very severe. Dressed leg on pillow, with lateral and posterior splints. July 8th, patient very comfortable, having rested quietly all night. No untoward symptoms on the 9th, 10th or 11th. On the morning of the 12th find slight fever, pulse 92, but experienced great

difficulty in swallowing. In four hours began to have tetanic spasms, slight opisthotonos, which continued until 10 P. M., at which time the patient died.

Dr. T. J. Hutton, of Fergus Falls, Minn., in a letter written December 25th, 1886, says: "I saw two cases of tetanus, 12 and 14 years of age, from injuries to the hand; one a lacerated wound (severe), the other a gunshot wound; one proceeded to a fatal result, the other was quite pronounced when I wrapped the injured member in warm laudanum and water, 1 oz. to the pint. This boy recovered."

Dr. J. M. Beard, of Millport, N. Y., reports the following from memory: "Boy, aged 12 years, July 16th, 1882, fell from a horse, fracturing left tibia and fibula transversely, one and a half inches above ankle joint; the tibia protruded through the skin. When I saw him the wound and end of the bone were covered with horse manure and dirt. Cleansed wound thoroughly and reduced the fracture, dressed as usual in such cases; prescribed morphia acetas in ¼ gr. doses to subdue pain. July 18th, dressed wound; slight symptoms of tetanus; prescribed chloral hydrate from this time until July 21st. Tetanic symptoms very mild and a greater portion of the time absent; slight suppuration from the wound. July 23d, tetanic symptoms aggravated. Called Dr. H. W. Davis in council; used chloroform by inhalation, effect only temporary. July 24th and 25th patient grew worse, and died July 26th.

"I have no theory to offer in this case, but am certain the foul matter in the wound, when I first saw it, was the exciting cause, as nearly three hours elapsed between receiving the injury and the first dressing."

The following case is reported by Dr. Bransford Lewis, Senior Assistant Physician, St. Louis City Hospital:—

M. C., male, aged 12, Missourian, single, lamplighter; admitted December 10th, 1886. On the day before his entrance to the hospital, patient put some lumps of phosphorus in his left trousers pocket, soon after which they ignited, setting fire to his clothing and burning the epidermis from his left hip, all of thigh, penis, scrotum, perineum, internal surface of upper part of right thigh, both groins, both hands and all of the fingers. At the time of entrance, the patient was suffering great pain. The blebs, which were scattered over the burnt areas, were opened. Five per cent. carbolized boiled oil was applied to the affected parts, and morphine was administered for the relief of pain. During the first three days of his stay in the hospital, the patient improved rapidly, was cheerful, and took food readily. On the fourth day he began to have slight talkative delirium, which became almost constant, but did not seem to occasion any interference in the progress of his recovery. On December 21st it was noticed that he was extremely restless, moving constantly from side to side in the bed. This uneasiness rapidly increased; delirium, which until then had frequently given way to lucid intervals, now became continuous, and on the following day he first showed symptoms of tetanus. He could open his mouth only with difficulty, and deglutition—even liquids—was interfered with to some extent. At the same time his head began to be drawn backward. These muscular contractions were much increased the next morning, but with an effort, patient could still open his mouth partially. Opisthotonos then began to make its appearance. Patient complained but little, was very restless, and was delirious most of the time, groaning frequently during the short naps which he was able to take. Bowels inclined to constipation; were moved with an enema. Urinary secretion remained unaffected. On December 22d patient became semi-comatose—an effect of the bromide of potassium and chloral which he had been taking. Physostigma had also been used hypodermically, seemingly without effect. The physostigma was then discontinued, subcutaneous injections of Fowler's solution being used in its stead. The physiological effect of the drug was obtained, but no change, except for the worse, was to be noticed in the patient's condition. Before death the masseters relaxed somewhat, in conjunction with the increasing weakness of patient. There was no marked elevation of temperature shortly

before death, which occurred at 6.20 o'clock on the morning of the 24th. Opisthotonos remained to the last.

TREATMENT.

Tetanus happily occurs infrequently in civil practice, so that the experience of any individual surgeon is necessarily limited. The literature of the subject is abundant, but as it certainly includes many cases that were not tetanus, and as so many cases have symptoms in common with tetanus, it is impossible, without the presence or history of a wound, to determine, with any degree of certainty, whether the case is one of so-called idiopathic tetanus or some other disease; therefore the statistics, as regards the results of treatment, are not of much value.

The treatment of tetanus, as a rule, has been very unsatisfactory, and, as in all diseases where remedial measures have seemed to have but little effect toward arresting the progress of the disease, the number of remedies which have been used for its relief is necessarily very large.

The patient should be isolated, and perfect quiet maintained. In traumatic cases the wound or injury should be thoroughly explored and cleansed, to remove, as far as possible, all source of peripheral irritation, and protected by antiseptic dressings, thus diminishing the inflammation and decomposition, which will do much toward preventing the occurrence of this much-dreaded and fatal disease, if it does not in many cases greatly assist in relieving the patient, after the spasms have already made their appearance.

As subjects of tetanus die not of the disease, but of the convulsions which it determines, it is important to watch the patient carefully, and to intervene with appropriate treatment in time to prevent the paroxysms.

In traumatic cases, the removal of the wounded part has seldom been followed by satisfactory results, as the disease was fully established before the operation was resorted to, and depended upon more than the irritation of the peripheral nerves, and thus the failure to relieve; though, if the disease could have been anticipated—before the morbid influence, whatever it may be, had manifested itself—the disease would probably be prevented by the removal of the wounded part. But, as the disease is apparently infectious, we should be more liable to get relief from using remedies that act through the medium of the circulation.

Supporting measures, such as concentrated nourishment, alcoholic stimulants, and quinine, have been found useful.

Dr. Regan, in the *Medical Summary*, relates a case of traumatic tetanus in which, by mistake, 260 grains of quinine were administered at a single dose. The next morning the patient was found resting well, sweating profusely, and with no symptoms of tetanus remaining. Two other cases were subsequently treated successfully by giving 100 grains of quinine every hour until the symptoms gave way. No bad results followed this heroic dosing.

The following remedies have been recommended for the treatment of tetanus: Fowler's solution of arsenic, jaborandi, tobacco, anæsthetics, curare, conium, cannabis-indica, calabar bean, opium, chloral hydrate, the bromides, belladonna, and cocaine.

Dr. M. Lopez reports a case of idiopathic tetanus, which was treated by morphia sulph. and chloral hydrate. For three days the pain was lessened, but the muscular rigidity and cramps increased, and he became unable to swallow. Morphine was injected hypodermically, but was followed by no amelioration of the symptoms. Three syringefuls of the mixed solutions of morphine and cocaine (each 5 per cent.) were then injected. The effect was immediate. After two hours he could move his limbs, turn in bed, and open his mouth. On the next day he was going on well, and the day after, all the symptoms had disappeared.

The *New York Medical Journal* for July, reports a case, from a French journal, of

idiopathic tetanus in which a five per cent. solution of the hydrochlorides of morphine and cocaine was used hypodermically with success. After three injections had been given (amount not stated) the trismus was diminished, and the patient was able to execute certain voluntary movements. One additional injection on the following day was followed by complete recovery.

Dr. R. C. McChord, of Lebanon, Ky., read before the Section on Surgery and Anatomy, at the 38th Annual Meeting of the American Medical Association, June 7th of this year, a report of the treatment of four cases of acute traumatic tetanus, by the use of large doses of bromide of potassium, the dose ranging from 10 to 30 grains every two hours. In summarizing, he says: "The first case was treated with bromide of potassium and chloroform and recovered. The second case with bromide of potassium and chloroform, and, although the mildest of the four cases, died; I think simply from neglect to keep up the administration of the potassium. The third case was treated with chloroform, bromide of potassium, and chloral; recovered physically, but was mentally a wreck; whether the latter was due to the potassium, or chloral, or not, I am not prepared to say. The fourth case was treated by amputation, bromide of potassium, and chloral, with perfect recovery in every respect. He used chloroform and chloral hydrate to control the spasms, while he administered the bromide of potassium for its permanent effect."

The application of pounded ice, ether, or rhigolene spray along the spine, have been used with apparent benefit.

## DEBATE.

After the reading of Dr. Brown's paper on "The Etiology and Treatment of Tetanus," and the announcement by title of the paper of Dr. Browning, the President called upon Prof. Dr. J. McF. Gaston, M. D., of Atlanta, Ga., to open the discussion.

Dr. Gaston regretted that the paper upon "The Microbic Origin of Tetanus," by Dr. Browning, had not been presented,* as it doubtless would have afforded the results of his experimentation, and thus given data of a definite nature upon this subject. As the paper just read before the Section claimed not only the bacterial origin of this disease, but recognized it as being contagious or infectious, it behooves us to consider how far the positions taken are tenable. It has been taken for granted, in a lecture by Dr. N. Senn, of Chicago, that germs are the cause of tetanus, but no proof is adduced which is calculated to satisfy the investigator, and it appears, in the paper presented by Dr. Brown, that he has not eliminated the doubts which may exist in regard to this etiological factor. Cases of tetanus occur within a few hours after an injury, as reported in the work of H. C. Wood, and it is not presumable that germs could enter and do their work in so brief a period. Cases result from the cicatrization of wounds in which there is no longer any abrasion or lesion to admit of their penetrating the tissues. Cases ensue from certain agents introduced into the stomach, as strychnine, so that this pathological condition of the nervous system may be induced independently of any suspicion of bacterial origin. It is begging the question to claim that tetanus is due to bacilli, because a bacillus of a destructive character has been found in the course of the disease, since it may be an accompaniment, without having any connective influence.

In regard to the claim of contagiousness, based chiefly upon the observation that horses in the same locality have developed tetanus, and that it has appeared syn-

* Owing to his investigations not having been completed in time.

chronously or subsequently in man, it should be considered that there are predisposing atmospheric conditions in some localities, and under modifications of humidity and cold, which explain the occurrence of the disease without implying its infectiousness or its contagiousness, in the ordinary acceptation of those terms.

The presumption raised in favor of its extension from animals to man, under such circumstances, is not tenable, and more direct evidence of the communicability of this disease is required to secure conviction on the part of those who require facts upon which to come to a correct conclusion, and the speaker held that he could not accept such data as final.

For the proper understanding of the etiology of tetanus, it is requisite to define the nature of this affection, and, the pathology of the disease being involved in much doubt, the data for ascertaining the true character of tetanus are not, by any means, satisfactory.

All concur in pronouncing it a spasmodic disorder of the nervous system, with tonic contractions of various muscles. In most cases there is not, at the outset, any indications of a febrile development, yet, in its progress, the temperature frequently rises very high, and increases even after death.

The origin of the disorder is, for the most part, in a lesion of the remote branches of the nerves of the extremities, the hands and feet being often the seat of slight injuries, which fester without forming pus, and lead to this disturbance. It is a matter of moment to determine the exact nature of the change which takes place in the injured part, but there is, thus far, no definite criterion for deciding the pathological status of the local trouble, and the recent researches as to ptomaines, induce me to venture a solution of the difficulty upon the hypothesis of septic infection, from a degeneration of the cellular elements, by absorption of the decomposed and disintegrated structure of a circumscribed area, which has been injured.

Incised wounds, with clean-cut edges, are not found to produce tetanus, but punctured or lacerated wounds are frequently the cause of it, and comparatively slight abrasions of the superficial tissues may cause it. A local neurosis of the constituents of the organization most likely results from the peculiar lesion, and there are none of the ordinary phenomena of inflammation, such as heat, redness or swelling in the immediate locality, nor is the irritation of the tissues accompanied with suppuration. The local injury may or may not cause pain in the part, and, indeed, instances have occurred in which the individual is not conscious of having received a wound, so that it becomes necessary to search for the peripheral lesion, after the spasm of the muscles is developed.

It is a mooted point, whether tetanus ever occurs independently of a local lesion of the peripheral fibrillæ of the nerve in some portion of the body. Most of the so-called idiopathic cases are referable, upon close investigation, to a wound not previously recognized by the patient, and doubtless there may, in some instances, exist internal lesions, which are not capable of being discerned by any mode of examination, externally.

What is known of the etiology of tetanus? Will any one claim that the proximate cause of the disease is understood, or that its pathology has been accurately defined? Certainly no one who is acquainted with the observations of those most competent to interpret what is found after a death from tetanus, either in cases which run their course to a fatal result in a few hours, or those which have terminated in death after days and weeks of suffering, can feel assured of the exact process which has brought about the result. We have instances recorded in which death has ensued from tetanus in a very brief space of time after the infliction of a compara-

tively slight superficial injury, when it was simply impossible that any inflammatory process could have extended from the peripheral to the central nervous organization.

It would seem impossible, under such conditions, that germs could have any agency in developing the disease, and, though a bacillus is found in the progress of more protracted cases, it is not likely that it enters as an etiological factor. The recourse to germs, in lieu of the causes, is like the case of a man who recommended his dog for hunting coons, because he had never found him useful for anything else. If we proceed, by exclusion, to settle down upon the bacterial origin of tetanus, it has no real foundation.

As to the contagiousness of the disease, all may be explained upon the existence of a common origin. The theory of neuritis being extended to the spinal column and producing a modified myelitis, does not seem a satisfactory solution of the perturbation of the nervous system and the muscular organization, which characterizes this disease.

The view of reflex action, through the spinal column, does not meet the developments presented by the tonic spasm of the muscles. There is a relation between the minute nerves and capillaries, which is transmitted to the nerve centres of the ganglionic and spinal systems, that may give a clue to the phenomena of tetanus; and this combination has been defined in a paper on the pathology and therapeutics of the nerve centres, etc., presented by me to the Medical Association of Georgia, and published with the transactions of 1884.

If we can properly appreciate the changes, which ensue in the part injured, and comprehend the propagation of this septic contamination from the peripheral to the central portion of the nervous system, we may have an interpretation of the grave results ensuing from an apparently slight cause. That it does not partake of the nature of lymphangitis or phlebitis, nor present any of the characteristics of ordinary inflammatory action in the local lesion, seems to exclude all the agencies which operate in producing such changes, and leaves us to study the element of nervous irritation separately.

In reference to the treatment of tetanus, all concur, perhaps, in the general management of these cases adverted to in the paper, as based upon a recognition of those agencies, which operated through the nervous system. The attention of the Section was asked to the results obtained by the speaker in securing favorable results in ten out of eighteen cases which had come under his observation in this country and in South America. It had been his practice to obtain the controlling effects of chloroform at the outset. If there appeared any marked derangement of secretions, remedies were then applied for their correction; and afterward recourse was had to bromide of potash and chloral hydrate, until their effects were manifested profoundly. This had been attended with salutary influence upon the tetanic spasm. Morphine with quinine had been resorted to in the intervals, with good results. It was found in one case that the lobelia inflata, given by the mouth (and by enemata, when the stomach would not retain the remedy), had secured a cure in a well-defined case of traumatic tetanus. This case was referred to in Wood & Bache's Dispensatory many years ago, under the head of lobelia. Tobacco injections had also been efficacious in a case, but were attended with such depression of the vital powers, as to cause serious apprehension of a fatal prostration, and deter him from their repetition in other cases.

The local application of chloroform to the spinal column had been resorted to, in accordance with the inhibitory action of such an application noted by Brown-Sequard in the inferior animals. But no ultimate advantage had been gained by this local measure.

A report of the treatment of tetanus by the hypodermic injection of chloral into the point of the lesion had been made by some author (whose name cannot be recalled), with complete relief of the tetanus. This seemed a rational mode of proceeding, as the remedial agent went into the system through the same channels that the disease entered. It is certainly entitled to the consideration of those who would proceed upon philosophical principles in treating this affection.

The general good results obtained from saturating the patient with a combination of bromide of potash and the chloral hydrate—so as to produce a decided impression—affords encouragement for the most satisfactory result, and is confidently commended.

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## GUNSHOT FRACTURES OF THE FEMUR.

### LES FRACTURES DU FÉMUR PAR LES ARMES A FEU.

### SCHUSSFRAKTUREN DES FEMUR.

BY HENRY JANES, M.D.,

Formerly Surgeon U. S. Volunteers, Waterbury, Vermont.

After two battles in our late war, I was able to keep hospitals established on the field open for several months, and so could observe results in the various kinds of wounds, treated under similar circumstances, and in considerable numbers.

In the following paper on gunshot fractures of the shaft of the femur, I shall only use the records of these hospitals, excluding those of field hospitals under my charge less than two months, and of general hospitals at a distance from the seat of war. The first hospital was established in a church, with about 175 Union and Confederate wounded from the battle of Crampton's Pass, Md., Sept. 14th, 1862. It was kept open until the latter part of the following November. The second was the Letterman General Hospital, in which I had placed nearly 2000 of the most severely wounded, particularly those with penetrating wounds of the head and trunk, and fractures of the lower extremity, collected from about 20,000 Union men and Confederates left under my charge after the battle of Gettysburg, July 1st, 2d and 3d, 1863. This was a tent hospital, and was kept open until the following December.

In these two hospitals were treated 427 fractured femurs. The cases not terminated at the time of transfer have been followed up as long as possible; in some cases for ten years or more.

Ninety-five of these fractures were in the upper third of the bone, not involving the hip joint. All but one treated conservatively, with a mortality of 46 per cent.

Of the 125 fractures in the middle third, 102 were treated conservatively, with a mortality of 33 per cent., and 23 were treated by amputation in the upper third, with 40 per cent. of deaths.

There were 207 fractures in the lower third, 67 of which, not involving the knee-joint, were treated conservatively, with 20 per cent. of deaths. In 140 cases, including those fractures involving the knee-joint, amputation was performed, with a mortality of 35 per cent.

Besides these 427 cases, there were 34 fractures involving the knee-joint treated

conservatively, because the patients would not consent to amputation; 85 per cent. of these proved fatal.

As a general rule, the cases of amputation terminated the earliest, either by death or recovery; but about one-eighth of them had chronic bone inflammation, resulting in more or less necrosis at a late period, or in interminable chronic osteo-myelitis, ultimately involving the whole bone, if the patient lived long enough.

This chronic non-infectious osteo-myelitis is a frequent cause of death at a late period after amputations and compound fractures treated conservatively; and septicæmia or pyæmia, following acute osteo-myelitis, was a frequent cause of the earlier deaths.

Some authors think that bone inflammations, commencing in the shaft, have a tendency to stop at the epiphysis, and that, consequently, in young subjects, the joints are less likely to become implicated. If this is the case, the mortality in fractures of the upper third of the femur in subjects of eighteen years and less (*i. e.*, before the age of consolidation of the head with the shaft) ought to be below that of older patients, other things being equal. The same ought to be the case with fractures of the lower third in patients below twenty, or the time of consolidation of condyles and shaft. Our statistics fail to prove this. The following table is made up from 289 cases, in which the age is recorded. The numbers in some of the divisions are too small to be of much value, *e. g.*, in each division in which the mortality was 100 per cent. there was but one case. (See pages 262, 263, 264.)

It is generally believed that the results in antero-posterior wounds are better than in transverse, on account of the better drainage of the former in the recumbent position. My statistics, however, do not prove this. In 107 of the cases treated conservatively, the points of entrance, direction, and points of emergence of the missiles are noted with precision. The results are as follows:—

In the upper third, the mortality of the wounds (antero-posterior, or nearly so) was 41 per cent. and of the transverse, or nearly so, 15 per cent. In the middle third antero-posterior, 15 per cent., and transverse, 11 per cent. In the lower third, antero-posterior, 14 per cent., transverse, no deaths.

The wounds, whatever their direction, generally kept pretty well drained if there were no bone inflammations or blood poisonings, causes which have much more to do with the extensive burrowings of pus along the muscular interspaces, so common after gunshot fractures, than the direction of the wounds.

Despondency has always been thought to have an unfavorable effect upon the wounded, and prisoners of war are never expected to do as well as their captors.

Our statistics seem to confirm this belief, for the mortality of the fractures in the upper third, treated conservatively, was 44 per cent. for the Union men, against 50 per cent. for the Confederates. In fractures of the middle third, it was 22 per cent. for Unionists, and 50 per cent. for Confederates; and in the lower third, 17 per cent. for Unionists, and 21 per cent. for Confederates.

In these hospitals, absolutely no difference was made in the treatment of the prisoners and their captors. They were kept amicably side by side, and at Gettysburg the prisoners were mostly under the care of ward attendants from their own army, whose requisitions for medicines and luxuries were honored the same as those for our own men.

Union sometimes occurs as readily in gunshot as in simple fractures of the femur. In seven of our fractures in the upper third, in nine of the middle third, and in eleven of the lower third, recovery had taken place before the end of the third month. The following is an illustrative case: Willis Starkey, æt. 18, wounded September 14th, 1862, by a bullet, which entered the upper third of the left thigh on the outside, passed upward, fracturing the femur, and emerged at the cleft of the nates. The limb was put up in a long fracture box, with the outside reaching up to the axilla; very little exten-

sion was made. In four weeks a starch-bandage was applied, and as soon as it was dry, the patient was given a pair of crutches; at that time, union was considerably firm, and suppuration had nearly ceased. In six weeks from the time of injury the wounds had healed, and, the limb being strong enough to bear about one-half the patient's weight, he got his starch-bandage off, and, thereafter, no retentive apparatus was used. Twelve weeks from the time of injury he was sent back to his own regiment, at his own request, able to walk without crutch or cane. The limb was in good position, but shortened one inch. After the fourth week, Starkey was out on crutches every day, and the day after the starch-bandage had become firm and dry, I saw him running races on the sidewalk with a man whose leg had been amputated four weeks before.

He was discharged from the service at the convalescent camp, before getting back to his regiment.

Partial fractures or contusions of bones are often followed by inflammations, as soon as after complete fractures. In these cases, the vitality of the bone is destroyed, for a considerable distance, by the shock of the blow, or by the subsequent inflammation, and more or less necrosis follows, or, perhaps, acute or chronic osteo-myelitis.

False-joint occurred but once in these hospitals, among the terminated cases of fractures of the femur. The following is a brief history of this case: S. M., æt. 26, had a nearly transverse gunshot fracture of the upper third of the left femur. The limb was placed on a double inclined plane, and by the fifth week partial union had taken place. In the course of the next month the wound began to do badly. The suppuration was profuse, there were night sweats and hectic fever. The patient died, pyæmic, in the ninth week. At the post-mortem examination it was found that a complete false-joint had formed, the wounded ends of the bone being covered with a smooth fibrous membrane.

In my experience, false-joints have occurred oftener after fractures of one of the leg-bones, than after fractures of the femur, the sound bone keeping the fractured ends apart, after the fragments had necrosed and come away.

High velocity of the missile seems to increase the mortality rate, probably on account of the more severe and extensive bone inflammation following the more violent blow. In the upper third, the mortality from fractures caused by balls recorded as lodging, was the same as from balls recorded as emerging; but in the middle third it was as fourteen to twenty-three. In the lower third, but one bullet causing fracture is recorded as lodging—the patient recovered; sixteen per cent. of the fractures caused by balls recorded as emerging, were fatal.

Secondary hemorrhage occurred in nine of the cases of fracture of the shaft treated conservatively. In three of the fatal cases the particulars are not fully recorded, and have now escaped my memory. In the other six, the hemorrhage was promptly stopped, by ligation or otherwise. Two patients were alive ten months after the ligation of the femoral in Scarpa's space; one, with fracture of the neck of the femur and pubic bone, died comatose, five hours after ligation of the external iliac, only about eight ounces of blood having been lost. In two of the remaining cases, death occurred within twenty-four hours. The other case lived for seven weeks, dying at last from excessive suppuration, rather than from the bleeding.

In three of the cases of fracture involving the knee-joint, treated conservatively, slight hemorrhages occurred from the thirtieth to the one hundred and twenty-fifth days, as incidents in the progress of bone inflammations and septic poisonings. The deaths, several days later, were rather from the progress of the disease, than from the loss of blood.

Tetanus occurred but once among the cases treated conservatively, commencing on the twenty-fifth day, and causing death on the thirty-sixth day.

There were two fatal cases of tetanus among the intermediary amputations of the thigh.

At the Crampton's Pass Hospital there were no cases of hospital gangrene, and none at Gettysburg, until the latter part of August or the first of September. The weather at that time was cold and damp, and for several days it was impossible to get stoves enough to keep the patients comfortable, so it was necessary to close the tents and supply each patient with several extra blankets. The free ventilation of the wards and wounds being thus interfered with, gangrene soon made its appearance, and spread to a considerable extent, in spite of the greatest care as to cleanliness, and prompt isolation of the infected cases.

After a few days, stoves were procured, and soon the weather became pleasant again, so that it was possible to dry and ventilate the tents, and dispense with the extra blankets. Immediate improvement followed, and there were no more new cases until the cold, wet weather of late fall set in.

Hospital gangrene attacked four cases of fracture of the femur. One of the upper third, who was doing badly before, and who died two days after the gangrene showed itself, and eighty-one days after injury. The other three cases were of fractures in the lower third. One proved fatal fifty days after injury, and five days after the appearance of the gangrene. This patient was in a bad condition before the gangrene set in. One of the remaining cases was transferred to another hospital before he recovered, and there is no subsequent report. The other case recovered.

I suppose that shortening occurred in every case of union, and the effort was seldom made to entirely prevent it. In nearly all cases of fracture of the shaft of the femur by a minie bullet, the bone is shattered from one inch to six inches, and a large part of the fragments will necrose. Now, if the limb is kept out to its full length, union will be tardy, if it ever takes place. In our cases the shortening was seldom so little as one inch, and often as much as six inches. Sometimes, use of the limb increases the shortening, and, in a number of instances, according to the reports of various pension examiners, the shortening had increased several inches since the time of discharge from the hospital. In most, if not all these cases, the shortening is caused by a bending of the imperfectly-ossified callus, as occasionally happens after simple fractures.

Sometimes, after gunshot fractures, an excessive amount of callus is thrown out, and it is occasionally so voluminous and irregular as to materially interfere with the proper action of the muscles. This callus is most exuberant when there has been considerable comminution. It usually takes the form of a sort of shell, inclosing the fractured ends, or it is thrown out in nodules or vegetations around the bony fragments, which are scattered in the soft parts, but which will retain their connection with the periosteum, and their vitality. When the callus takes the shell form, the large cavity is liable to be imperfectly drained, and the fluids therein, decomposing, are apt to cause symptoms of septic poisoning, which sometimes disappear, as if by magic, when the cavity is freely opened, emptied and disinfected.

Sometimes the callus presses upon a blood vessel so as to cause ulceration of its coats, and hemorrhage, or upon a nerve so as to cause neuralgia. The following is an illustrative case: L. B., æt. 17, was wounded by a minie bullet, which entered the lower part of the right thigh in front, passed upward and backward, fracturing the femur in the lower third. Smith's anterior splint was applied. The wound had healed by the 28th of July, and a large ring of callus had formed; the shortening was one inch and a half. He complained of severe pain in the sole of the foot, which, notwithstanding the use of anodyne hypodermic injections, continued up to August 10th. It being evident that the callus was pressing upon the sciatic nerve, acupuncture was resorted to with success. During the month of September the pain was slight, and on the 15th of October he was transferred to Baltimore, "cured." About a month later he was sent to City Point for exchange.

Occasionally, after union has become quite firm, the callus is resorbed again, generally in the course of some septic inflammation.

In a number of instances, after union, refractures were caused by sudden slips or falls. If there were no open wounds, or necrosis, these refractured bones reunited as readily as after simple fractures.

It very rarely happens that a patient, with a gunshot fracture of the femur, recovers perfectly enough to again do duty in the field as an infantry soldier, but a large proportion preserve limbs much more useful than any artificial substitutes. I have no means, however, of calculating the percentage of these cases. It is evident that this important subject can never be properly treated by one who has not free access to the army hospitals and pension records for many years after the war.

In the summer and fall of 1864, I was frequently in Washington on duty, and was able, by working at nights, to bring up my own records as far as possible from the data then in the Surgeon-General's Office, owing to the courtesy of Ass't Surg. Gen. Crane. Subsequent additions have been made from published articles, in which, I am sorry to say, the results of conservatism are much less fully treated than those of operation. I show a few photographs of patients from one of my hospitals, at a distance from the seat of war. They show, better than can be done by words, the condition of the limbs several months after gunshot fracture of the femur.

Before such an audience as this, it seems hardly proper to say much as to the treatment of gunshot fractures, but, perhaps, I may be pardoned for making a few suggestions.

First, as to sawing off the fractured ends of the bones, or the thorough removal of fragments still attached to the periosteum. I believe it unnecessary, and, in general, bad practice. If a formal primary resection is made, it is very difficult to avoid injuring the periosteum, and so interfering with the formation of the callus. The same may be said as to the forcible tearing away of fragments still firmly attached to the periosteum. More or less of them will become loosened after inflammation sets in, and the periosteum swells and becomes more succulent; they may then be removed without injury to the membrane. The fragments, retaining their vitality, act as centres of ossification, and hasten the formation of the new bone. At the first dressing, it is best to remove from the wound all foreign bodies carried in by the missile, but only the fragments of bone that are entirely detached from, or but slightly adherent to, the periosteum, leaving the rest to become loosened, from time to time, by the suppurative process.

Second, as to extension. I believe that attempts to entirely prevent shortening, increases the mortality rates, and I am confident that the best results, both to life and limb, are attained by using only enough extension to prevent overlapping of the bones. In some of the cases which did the best, no extension was used. Very few cases could be treated to advantage with the same apparatus from beginning to end. In the majority of cases the most satisfactory appliances were bags of sand at the sides of the limbs, to prevent rotation, with moderate extension by a weight and pulley.

Smith's anterior and Hodgin's splints often did good service, especially when there were wounds behind; but in fractures of the upper third it was difficult, sometimes, with them, to prevent tilting forward of the upper fragment.

Occasionally, the double inclined plane was used to good advantage, and sometimes a long fracture box, with the outer side extending up to the axilla, served better purpose than anything else, especially in fractures high up.

The long straight splint, with the perineal counter-extending band, or starch or plaster bandages, could seldom be used at first, but, after the wounds were healed, and the patients began to go about on crutches, the latter were often useful.

Rigid antisepsis, according to the modern ideas, is impossible in large military hospitals on the battle fields, but I believe that the liberal application to gunshot wounds of dry absorbents, such as kaolin, dry earth, wood pulp, oakum, antiseptic wool or cotton, etc., if obtainable in sufficient quantity, is of great service.

In these hospitals the patients were fed very liberally, and, at Gettysburg, malt liquor was used quite freely; twelve barrels of ale, besides other stimulants, being dispensed daily, at first. Red tape was cut frequently, and the hospital fund ran behind some $17,000, if I recollect rightly.

## DEBATE.

Dr. Reyburn, of Washington, D. C., expressed his gratification at the admirable results of the cases of gunshot fractures reported in the paper and treated by Dr. Janes, and believed the good result largely owing to the fact that these patients were treated in tents. Tents make by far the best hospitals. His own personal experience was that nearly seventy-five per cent. of cases of gunshot fractures of femur died when treated in hospital buildings made of wood or brick.

## GUNSHOT FRACTURES OF THE FEMUR.—RESULTS OF TREATMENT FOR THE DIFFERENT AGES.

### FOR 18 YEARS OF AGE AND UNDER.

| | Fractures of Upper Third. | | | | | | Fractures of Middle Third. | | | | | | Fractures of Lower Third. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Number of Cases. | Treated by Conservation. | Treated by Amputation. | | | | Total Number of Cases. | Treated by Conservation. | Treated by Amputation. | | | | Total Number of Cases. | Treated by Conservation. | Treated by Amputation. | | | |
| | | | Place of Amputation. | Primary. | Inter-mediary. | Secondary. | | | Place of Amputation. | Primary. | Inter-mediary. | Secondary. | | | Place of Amputation. | Primary. | Inter-mediary. | Secondary. |
| | | | | | | | | | Upper 3d. | | | | | | Middle third, 7<br>Lower third, 7 | 5<br>6 | 1<br>1 | 1<br>... |
| Number of cases | 4 | 4 | ... | ... | ... | ... | 23 | 21 | 2 | 1 | 1 | ... | 20 | 6 | 14 | 11 | 2 | 1 |
| Recovered | 1 | 1 | ... | ... | ... | ... | 9 | 8 | 1 | 1 | ... | ... | 14 | 3 | 11 | 9 | 2 | ... |
| Died | 2 | 2 | ... | ... | ... | ... | 7 | 6 | 1 | .. | 1 | ... | 3 | ... | 3 | 2 | ... | 1 |
| Not terminated | 1 | 1 | ... | ... | ... | ... | 7 | 7 | ... | ... | ... | ... | 3 | 3 | ... | ... | ... | ... |
| Percentage of deaths | 50% | 50% | ... | ... | ... | ... | 30% | 28% | 50% | ... | 100% | ... | 15% | ... | 21% | 18% | ... | 100% |

### FROM 19 TO 24 YEARS OF AGE.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Upper third, 5<br>Middle third, 18<br>Lower third, 20 | 2<br>13<br>12 | 2<br>4<br>5 | 1<br>1<br>3 |
| | | | Upper 3d. | | | | | | Upper 3d. | | | | | | | | | |
| Number of cases | 39 | 38 | 1 | ... | ... | ... | 27 | 18 | 9 | 7 | 2 | ... | 54 | 11 | 43 | 27 | 11 | 5 |
| | | | | | | | | | | | | | | | Upper third, 3<br>Middle third, 10<br>Lower third, 11 | 2<br>7<br>9 | 1<br>3<br>2 | ...<br>...<br>... |
| Recovered | 10 | 10 | ... | ... | ... | ... | 12 | 6 | 6 | 4 | 2 | ... | 28 | 4 | 24 | 18 | 6 | ... |
| | | | | | | | | | | | | | | | Upper third, 2<br>Middle third, 8<br>Lower third, 6 | ...<br>6<br>2 | 1<br>1<br>2 | 1<br>1<br>2 |
| Died | 18 | 18 | ... | ... | ... | ... | 6 | 4 | 2 | 2 | ... | ... | 19 | 3 | 16 | 8 | 4 | 4 |
| Not terminated | 11 | 10 | 1 | ... | ... | ... | 9 | 8 | 1 | 1 | ... | ... | 7 | 4 | 3 | 1 | 1 | 1 |
| Percentage of deaths | ... | 47% | ... | ... | ... | ... | 22% | 22% | 22% | 28% | ... | ... | 35% | 27% | 37% | 29% | 36% | 80% |

## FROM 25 TO 29 YEARS OF AGE.

| | Fractures of Upper Third. | | | | | | Fractures of Middle Third. | | | | | | Fractures of Lower Third. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Treated by Amputation. | | | | | | Treated by Amputation | | | | | | Treated by Amputation. | | | |
| | Total Number of Cases. | Treated by Conservation. | Place of Amputation. | Primary. | Inter-mediary. | Secondary. | Total Number of Cases. | Treated by Conservation. | Place of Amputation. | Primary. | Inter-mediary. | Secondary. | Total Number of Cases. | Treated by Conservation. | Place of Amputation. | Primary. | Inter-mediary. | Secondary. |
| | | | | | | | | | | | | | | | Upper third, 2 | 1 | ... | 1 |
| | | | | | | | | | | | | | | | Middle third, 10 | 8 | 2 | ... |
| | | | | | | | | | | | | | | | Lower third, 10 | 7 | 3 | ... |
| Number of cases | 16 | 16 | ... | ... | ... | ... | 24 | 20 | ... | ... | ... | ... | 33 | 11 | 22 | 16 | 5 | 1 |
| | | | | | | | | | | | | | | | Upper third, 2 | 1 | ... | 1 |
| | | | | | | | | | | | | | | | Middle third, 4 | 4 | ... | ... |
| | | | | | | | | | Upper 3d. | | | | | | Lower third, 2 | ... | 2 | ... |
| Recovered | 7 | 7 | ... | ... | ... | ... | 13 | 10 | 4 | 3 | 1 | ... | 15 | 7 | 8 | 5 | 2 | 1 |
| | | | | | | | | | | | | | | | Upper third, ... | ... | ... | ... |
| | | | | | | | | | | | | | | | Middle third, 1 | 1 | ... | ... |
| | | | | | | | | | | | | | | | Lower third, 3 | 2 | 1 | ... |
| Died | 3 | 3 | ... | ... | ... | ... | 3 | 2 | 3 | 2 | 1 | ... | 4 | ... | 4 | 3 | 1 | ... |
| Not terminated | 6 | 6 | ... | ... | ... | ... | 8 | 8 | 1 | 1 | ... | ... | 14 | 4 | 10 | 8 | 2 | ... |
| Percentage of deaths | 18% | 18% | ... | ... | ... | ... | 12% | 10% | 25% | 33% | ... | ... | 12% | ... | 18% | 18% | 20% | ... |

## FROM 30 TO 34 YEARS OF AGE.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Upper third, ... | ... | ... | ... |
| | | | | | | | | | | | | | | | Middle third, 9 | 7 | 2 | ... |
| | | | | | | | | | Upper 3d. | | | | | | Lower third, 1 | 1 | ... | ... |
| Number of cases | 5 | 5 | ... | ... | ... | ... | 8 | 5 | 3 | 2 | 1 | ... | 11 | 1 | 10 | 8 | 2 | ... |
| | | | | | | | | | | | | | | | Upper third, ... | ... | ... | ... |
| | | | | | | | | | | | | | | | Middle third, 6 | 5 | 1 | ... |
| | | | | | | | | | | | | | | | Lower third, ... | ... | ... | ... |
| Recovered | 3 | 3 | ... | ... | ... | ... | 3 | 2 | 1 | 1 | ... | ... | 6 | ... | 6 | 5 | 1 | ... |
| | | | | | | | | | | | | | | | Upper third, ... | ... | ... | ... |
| | | | | | | | | | | | | | | | Middle third, 2 | 2 | ... | ... |
| | | | | | | | | | | | | | | | Lower third, ... | ... | ... | ... |
| Died | ... | ... | ... | ... | ... | ... | 4 | 2 | 2 | 1 | 1 | ... | 3 | 1 | 2 | 2 | ... | ... |
| Not terminated | 2 | 2 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 2 | ... | 2 | 1 | 1 | ... |
| Percentage of deaths | ... | ... | ... | ... | ... | ... | 50% | 40% | 66% | 50% | 100% | ... | 27% | 100% | 20% | 25% | ... | ... |

## FROM 35 TO 39 YEARS OF AGE.

| | Fractures of Upper Third. | | | | | | Fractures of Middle Third. | | | | | | Fractures of Lower Third. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Number of Cases. | Treated by Conservation. | Treated by Amputation. | | | | Total Number of Cases. | Treated by Conservation. | Treated by Amputation. | | | | Total Number of Cases. | Treated by Conservation. | Treated by Amputation. | | | |
| | | | Place of Amputation. | Primary. | Inter-mediary. | Secondary. | | | Place of Amputation. | Primary. | Inter-mediary. | Secondary. | | | Place of Amputation. | Primary. | Inter-mediary. | Secondary. |
| Number of cases | 6 | 6 | ... | ... | ... | ... | 1 | ... | Upper 3d. 1 | 1 | ... | ... | 10 | ... | Upper third, ...<br>Middle third, 7<br>Lower third, 3<br>10 | ...<br>4<br>3<br>7 | ...<br>3<br>...<br>3 | ...<br>...<br>...<br>... |
| Recovered | 4 | 4 | ... | ... | ... | ... | 1 | ... | 1 | 1 | ... | ... | 5 | ... | Upper third, ...<br>Middle third, 4<br>Lower third, 1<br>5 | ...<br>3<br>1<br>4 | ...<br>1<br>...<br>1 | ...<br>...<br>...<br>... |
| Died | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3 | ... | Upper third, ...<br>Middle third, 2<br>Lower third, 1<br>3 | ...<br>...<br>1<br>1 | ...<br>2<br>...<br>2 | ...<br>...<br>...<br>... |
| Not terminated | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2 | ... | 2 | 2 | ... | ... |
| Percentage of deaths | 17% | 17% | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 33% | ... | 33% | 14% | 66% | ... |

## FROM 40 TO 48 YEARS OF AGE.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Upper third, ...<br>Middle third, 3<br>Lower third, 1<br>4 | ...<br>2<br>...<br>2 | ...<br>1<br>1<br>2 | ...<br>...<br>...<br>... |
| Number of cases | 2 | 2 | ... | ... | | | | ... | Upper 3d. 1 | 1 | | | 5 | 1 | Upper third, ...<br>Middle third, 2<br>Lower third, ...<br>2 | | | ...<br>...<br>...<br>... |
| Recovered | | 1 | ... | ... | | | | ... | ... | ... | | | 2 | ... | Upper third, ...<br>Middle third, 1<br>Lower third, 1<br>2 | 1 | 1 | ...<br>...<br>...<br>... |
| Died | | 1 | ... | ... | | | | ... | 1 | 1 | | | 3 | 1 | | | | ... |
| Not terminated | | ... | ... | ... | | | | ... | ... | ... | | | | ... | | | | ... |
| Percentage of deaths | 50% | 50% | ... | ... | | | 100% | ... | 100% | ... | | | 60% | 100% | 50% | 50% | 50% | ... |

# THE KIND OF DRESSING MOST AVAILABLE FOR GUNSHOT FRACTURES OF THE LOWER LIMBS IN CONNECTION WITH TRANSPORTATION.

## LE PANSEMENT QU'ON DOIT PRÉFÉRER POUR LES FRACTURES DES MEMBRES INFÉRIEURS PAR LES ARMES À FEU, EU ÉGARD A LA TRANSPORTATION ULTÉRIEURE DES BLESSÉS.

## DIE ANWENDBARSTE ART DES VERBANDES FÜR SCHUSSWUNDEN DER UNTEREN EXTREMITÄTEN IM VEREIN MIT DEM TRANSPORT.

BY RICHARD FRANCIS TOBIN, M. Q. T. C. P. IRELAND, F. R. C. S. IRELAND.
Brigade Surgeon (retired); late Assistant Professor of Surgery, Army Medical School, Netley, England, Surgeon of St. Vincent's Hospital, Dublin.

Mr. President and Gentlemen :—My remarks have reference, chiefly, to gunshot fractures of the hip and the upper third of the femur; and as any one who has had practical experience of the difficulty of giving to such injuries—during transportation and subsequent treatment—that essential condition to recovery, viz.: rest, will gladly welcome any suggestion on this subject that may, even in a slight degree, be helpful, I shall make no apology to this assembly for occupying their attention during a very brief period. An appliance that will give rest to a fracture in the locality indicated, must fix, not only the injured limb, but also its fellow and the trunk as far as the thorax. For it is plain that if the sound leg is left free, the patient will try, from time to time, to ease his position by means of it, and so tilt the pelvis and disturb the fractured parts; and that even a still greater amount of disturbance will occur, if action of the psoas and iliacus muscles is permitted, by the movements of the pelvis and lower half of the spine being left unrestrained. It also seems to me desirable, that the appliance selected should fix the injured part by being placed behind it, rather than in front or at one side. A Liston's or a Bryant's splint, gives immobility as long as it is supplemented by the patient's bed, but, as far as my experience goes, no splint on which the limb does not rest by its own weight gives satisfactory support when, for any purpose, the patient has to be lifted. The foregoing conditions are fulfilled by the splint to which Mr. Thomas, of Liverpool, has given his name (Fig. 1), and by that of Mr. Fagan, of Belfast (Fig. 2), which was brought to the notice of this Section during the Congress of 1881. To the general employment of these on the field, the difficulty of fitting the one, and the costliness of the other, are obstacles—obstacles not insurmountable—and which, as the instruments are most useful ones, will, I hope, be overcome. In the meantime let me bring to your notice the following appliance, which affords rest and support in a somewhat similar manner but by means of materials more available on active service. The patient having arrived at the dressing station—where, by whatever name it may be known in different countries, the wounded first undergo a throrough examination—and it having been decided to make an attempt to save a limb fractured as described, I would proceed as follows: Having treated and dressed the wound after the fashion in vogue for wounds in general, the canvas of a stretcher with removable poles is spread upon the ground and is cut transversely into two, about its centre. The following materials are also made ready :—

1. Two pairs of trousers, viz.: that of the wounded man, and any other obtainable of about the same size.
2. A few strips of blanketing, or a few large towels or other material of a size to go, as a binder, around the waist and hips in three or four layers.
3. One stone and a half (21 pounds) of plaster-of-Paris.
4. Three gallons of water.
5. A bucket or other receptacle in which to mix the plaster and water.

FIG. 1.

'THOMAS' SPLINT FOR ONE LEG ONLY.

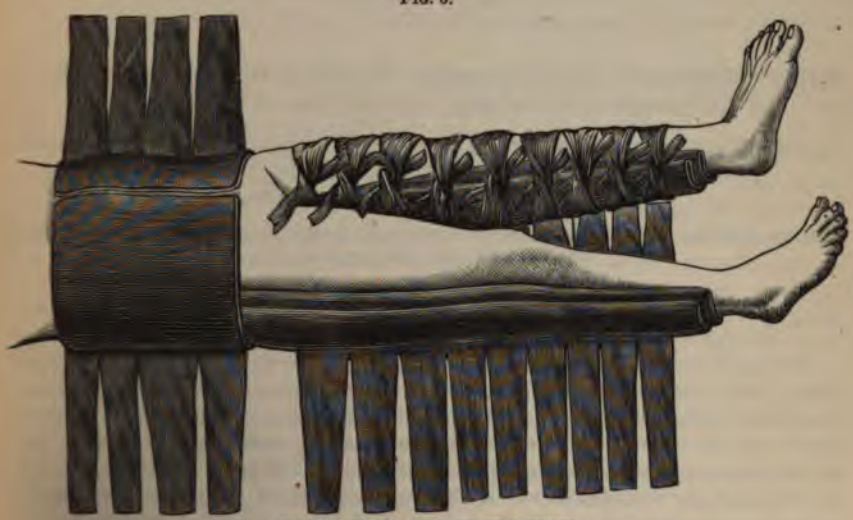
FIG. 2.

FAGAN'S SPLINT, SHOWING TRANSPORTATION.

6. Three yards of muslin or calico, torn into three many-tailed bandages.
7. A roll of cotton wadding.

The plaster is mixed with about an equal quantity, by measure, of water, and into the creamy fluid so formed, the two pairs of trousers, and the material that is to go around the waist and hips, as a binder, are immersed. When these have been thoroughly imbued with the fluid, the trousers are spread out, one over the other, on the canvas of the stretcher, the forks of the combined trousers being made to lie a few inches away from and above the division in the canvas, and a many-tailed bandage placed, ready to be tied, under each leg. The material which is to form the abdominal binder is spread, with a many-tailed bandage (Fig. 3) underlying it, transversely under the waist of the trousers; and over all a thick layer of wadding is laid. On the splint thus formed the patient is lowered in such a position that the margin of the fork of the trousers corresponds to a point two and a half inches above the anus, and that his legs, lying immediately over each leg of the trousers, are about six inches apart at the knees. The fractured limb is held in a good position by the surgeon, while two

FIG. 3.



TOBIN'S SPLINT LAID ON STRETCHER.

assistants, by tying together the tails of the bandage, bring the splint into close apposition with the posterior surface of the patient's legs, buttocks and loins, and make the binder encircle the hips and abdomen. As soon as the plaster has set, the poles are passed through the folds of the canvas and the patient is removed. The whole dressing, not including the treatment of the wound and the setting of the plaster, can be applied within a quarter of an hour by a surgeon and two skilled orderlies. During the subsequent treatment of the case the canvas of the stretcher is never removed from underneath the patient. When an action of his bowels is about to occur, the poles are put in position, the halves of the canvas are separated, the patient is raised, and a bedpan passed underneath him. He is lifted in a similar way when his wound requires to be dressed. The situation of this, may require that windows be made in the splint and canvas; and, in cases where it is apparent that this will have to be done, hoop iron, if obtainable, should be placed between the trousers when first put in position, so as to strengthen the splint under the injured limb.

I regret that (unforeseen circumstances preventing my being at the Congress) I am unable to show, by demonstration, how rapidly this splint can be applied, and what excellent support it affords. I have not brought it to your notice without having first thoroughly tested it by having had it tried on myself, in person, and I would strongly urge any one who may think of using it to do the same. Whoever does so will, I believe, be led to agree in this: that wherever reliable plaster-of-Paris can be obtained this method of applying it will give very great help in the treatment of a class of wounds than which no others baffle more the skill of military surgeons. Of course, the liability of plaster-of-Paris to deteriorate, is a great drawback to its use on active service, and it should, therefore, be tested immediately before being employed. There are also, I know, other objections to its use as a material for splints, but these have force chiefly when it is used so as to surround a limb, and not when it is made to lie against one and take its shape. So employed, it is, in my opinion, the dressing most available for gunshot fracture of the lower limbs in connection with transportation.

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## THE SUPERIORITY OF BAVARIAN PLASTER-OF-PARIS DRESSING IN GUNSHOT AND OTHER FRACTURES OF THE LIMBS.

### LA SUPRÉRORITÉ DU PANSEMENT À PLÂTRE BAVAROIS POUR TOUTES LES FRACTURES DES MEMBRES, SPÉCIALEMENT POUR CELLES CAUSÉES PAR LES ARMES À FEU.

### ÜBER DEN VORZUG DES BAYERISCHEN GIPS-VERBANDES FÜR SCHUSS- UND SONSTIGE FRACTUREN DER EXTREMITÄTEN.

BY JAMES H. PEABODY, M.D.,

Late Surgeon U. S. Volunteers, Omaha, Nebraska.

During the four years of our late civil war, much of my time was occupied in hospitals, in and around Washington, D. C., and St. Louis, Missouri. Ample opportunity was thus given to observe the results of the various appliances used on the field, and to decide as to their merit, the wounded generally coming under my care several days after having their wounds dressed. In the battles before Richmond and the Second Bull Run many of our wounded, as well as those of the Southern Army, were handled and dressed in a very hurried manner, then taken to transport boats or ambulances, and sent on to Washington with all expedition. It was my fortune, or misfortune, to re-adjust and re-dress many a bullet-shattered limb and examine the result of a great variety of splints and surgical appliances, from those crudely made of thatched straw, fence-paling, or shingle, to the more elaborate double-inclined plane, or Smith's anterior splint.

Many had been applied in great haste, perhaps, amidst the storm of battle, and the poor victim of horrid war sent quickly to the rear to receive more careful attention. In a majority of the fractures, the spiral reversed bandage was used; and my observation and experience convince me that it should never be used in severe gunshot wounds where much swelling is expected; this bandage being liable to cause strangulation; in fact, many cases of gangrene resulted from this cause after the above-mentioned engagements. In the spring of 1863 I was ordered to St. Louis, and had the honor of becoming acquainted with the lamented Dr. Hodgin, a man who, though comparatively young when he passed away, had made a name which will be honored as long as the history of American surgeons continues to be written. Dr. Hodgin had observed the same

trouble from strangulation of circulation by improper bandaging, in the wounded coming up the Mississippi, that I had noticed in many cases coming into the hospitals in Washington, from down the Potomac. He was at that date engaged in perfecting his cradle-splint, with separate slips of bandages, so as to give easy access to the wound and prevent strangulation.

The Doctor afterward perfected his splint and it now bears his name. Being then young, and having great opportunities to observe, I gave much thought to this subject, but never became satisfied with any splint until I used the one of which I now write.

About ten years since a distinguished surgeon of Bavaria—Nussbaum, of Munich, I believe—introduced a plaster-of-Paris splint, which he termed an "immovable dressing." Doubtless many gentlemen here are familiar with this splint; for those who are not I will give such history of its origin, use and manner of application, as I have been able to obtain.

Pirogoff, of St. Petersburg, was, I believe, the first to revive the use of plaster-of-Paris dressing, during the Crimean war. Seutin also is justly honored for having improved its form and given it value by many successful applications as a primary dressing. However, it was not received as a standard practice until Pirogoff's successes in army surgery attracted attention and caused many surgeons throughout Europe to adopt his method.

The plaster-of-Paris dressing, thus introduced, has gradually grown in favor, and much scientific investigation and mechanical skill, both in Europe and America, has been given toward its perfection.

The Bavarian splint, however, to my mind is the most perfect. The exact mode of its application I have not been able to learn. Bryant, in his late "Manual for the Practice of Surgery," London, 1884, page 406, gives quite a lengthy description of its mode of application and says it is "a mode which deserves to be more widely known than it is." I have seen several other articles, but they differ much; therefore, I will explain in as few words as possible the method I have adopted in imitation, and have used with great satisfaction in broken thighs, legs, arms, elbows, gunshot wounds and other injuries. I will describe its application to a fractured leg, as this will illustrate fully the *modus operandi* of its application. I use an old blanket in its manufacture, when I can obtain one, as the meshes are more open. Others use coarse flannel. To apply it to a fractured leg, measure from the second toe along the sole of the foot to the heel, thence along the leg to the condyles of the femur.

Cut two pieces of blanket of this length and sufficiently broad to encase the leg at its thickest part; lay one upon the other, and sew down the centre with two rows of stitches parallel and about half an inch apart, extending from the part above the knee, to the heel. The strip of blanket between these seams is intended to form a hinge, and the stitches are to prevent the liquid plaster penetrating that part of the blanket.

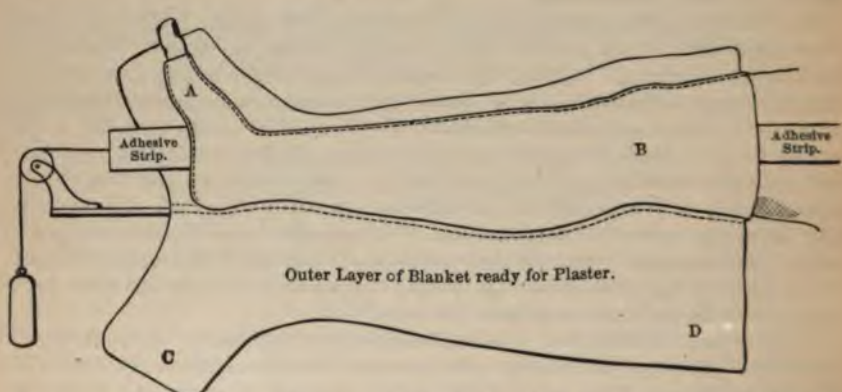
Lay the limb on a flat surface, and protect the bedding beneath it with oilcloth. Smooth out the blankets under the leg, lay over them a piece of cotton-batting the size of the piece of blanket. I sometimes leave the cotton out as the blanket is soft. Although I have never seen it mentioned, I now shave the limb and apply pieces of adhesive plaster for extension and counter-extension in case it is required. Adjust the fracture, and leave it in the hands of your assistants.

Now proceed to bring up the upper layer of blanket and the cotton batting from either side, fasten snugly and evenly with pins, on a line following the anterior aspect of the leg and along the instep to the second toe, then along the sole of the foot to the heel. With a needle and thread stitch a seam along this line and keep the blanket smooth and snug in order to make a neat stocking covering, for foot and leg. Now remove the pins and draw up the under blanket, pinning it as snugly as you can along

the line you have just stitched; trim off the blanket within an inch of the seam, take out the pins and spread out the under layer of blanket, leaving the limb snugly encased with the upper layer. Being now ready for the plaster, place two or three pints of soft water in a pan, add the plaster gradually and mix it thoroughly to the consistence of thin cream; pour this mixture over the blankets, and rub it thoroughly into the meshes of the inner or incasing layer and also on the outer layer; when this is done bring forward the outer layer and pinch it together at the base of the crest, thus forming a second thickness of smooth stocking encasing and giving strength to the inner one. Extension and counter-extension must be kept up until the plaster sets. In a few minutes this will harden sufficiently to retain the limb. You can now lay it upon a pillow, where it can be left for a day or two. I frequently leave them for weeks when the bones remain in proper position and the limb is comfortable.

If the patient complains of itching or any other discomfort, or should you wish to examine the point of fracture, you can easily cut the stitches along the front of the leg and the sole of the foot, and the casing will come open by reason of the hinge at the bottom. Now lay the limb on its side, and the under half of the splint will hold it in position while you proceed to examine, sponge and disinfect, if necessary. After examination, bring the case together and fasten it with strips of bandage, or if afraid of much swelling, slips of rubber may be used. Now, if you find it necessary, you can apply a weight to the adhesive straps at the foot, if in a hospital.

Annexed is a drawing of the splints:—




A, B, C, D.—Inner layer of blankets, represented as stitched snugly to the fractured limb and ready for plaster. The weight for extension is attached to the adhesive strip at the foot. Counter-extension plaster is on the thigh.

If in the field, a simple fracture box will be the best, if extension and counter-extension are needed. You will, however, be surprised to see how seldom this is needed if you apply your splint snugly; the irregularities about the knee with the outer and inner condyles of the femur, will give counter-extension, while the instep and malleoli keep up the extension or fixation. In case of a bullet or other wound, cut a trap so as to be able to dress the wound without disturbing the limb by removing the splint.

The Bavarian is truly a firm, but movable dressing, and after five years' use of it, I am satisfied that when properly applied and fairly tested, its superiority as a primary fracture dressing, for field or elsewhere, will be heartily endorsed by all who use it.

Its advantages are extreme cheapness, great adaptability for all shapes of injuries,

and the rapidity with which it can be applied. In the field, the materials are always to be had—an old blanket with needle and thread.

A bushel of plaster-of-Paris would be ample for a brigade, except after an Antietam or a Gettysburg, then perhaps a few pounds more.

The foregoing remarks refer more particularly to the use of this splint in field service.

I can heartily recommend it as a dressing for inflamed joints, sprains and other injuries, where you wish to keep the parts at rest.

As a primary dressing it is excellent, by reason of its equable pressure preventing any possible strangulation, and the evaporation of water from the plaster carrying off the heat.

I trust the mode of manufacture and process of application have been made plain.

I have used most every form of improved splint during four years' army surgery, and twenty years as a railroad surgeon and general practitioner, and have found none so good for all purposes as this.

If in bringing to the notice of this Congress a splint which has served me so well I may add to the comfort and ameliorate the suffering of the soldier of future wars, my object will have been accomplished.

DEBATE.

Surgeon JOSEPH R. SMITH, U. S. Army, said: The permanent immobilization of fractured limbs on the field of battle is impracticable. The injured limb must be rendered immobile temporarily by a common splint, by being fastened to the other limb, if the part involved is the leg, or to the body, if it is the arm. In the U. S. Army all these modes and materials have been used, and a large number of Army Surgeons have about concluded that some silicate is the neatest, lightest, strongest, and, taken all in all, the best dressing after the hospitals are reached. I have known patients thus protected travel a distance from Philadelphia to Maine.

Dr. BONTECOU, of Troy, N. Y., said that he preferred the silicates of soda or potassa to plaster-of-Paris, for the purpose of primary dressing for fractures of the lower extremities, with a view to transportation. They are cheap, harden quickly, are lighter, and can be carried to the field in tin cans, of the capacity of one or two litres, with a large mouth, and a screw-cap cover. The solution of the silicates should be of about the density of ordinary syrup.

Dr. MAX. J. STERN, of Philadelphia, had been in the habit of using the oxide of zinc and glue dressing. It is made by adding to one pound each of glue and oxide of zinc, a half gallon of water, and evaporating it by heat. This dressing has the advantage of being readily attainable, and does not deteriorate through age. Its extreme cheapness, the facility with which it can be made, and the rapidity with which it dries, are recommendations. This dressing is also durable and of comparatively little weight. If applied over a "cheese-cloth" bandage, either with the hands or a brush, it makes an exceedingly firm, rigid and elegant dressing. The materials will not degenerate in any climate, and the quantity mentioned, is sufficient for a large number of dressings.

Dr. HENRY H. SMITH (President) desired to remind the Section that the suggestion of the use of various substances as an immovable dressing was not a recent one, the starch bandage of Suetin dating back to 1843. Since then, dextrine, glue and brown paper, glue and oxide of zinc, plaster-of-Paris, and the silicates of potash, as well as of soda, had all been constantly employed in various forms of splints in the treatment of fractures, in hospitals, though he was not aware of their use in field hospitals, especially as suggested by Dr. Peabody. When accessible, the dressing recommended in his paper would doubtless facilitate transportation, but the silicate of potash bandage was lighter, neater, and quite as accessible, as a field dressing.

# WHAT CLASS OF GUNSHOT WOUNDS AND INJURIES JUSTIFY RESECTION OR EXCISION IN MODERN WARFARE?

## SUR QUELLE CLASSE DE BLESSURES DOIT-ON PRATIQUER LA RÉSECTION ET L'EXCISION DANS LA GUERRE MODERNE?

## WELCHE KLASSE VON SCHUSSWUNDEN UND VERLETZUNGEN RECHTFERTIGT DIE RESECTION ODER EXCISION IN DER MODERNEN KRIEGSFÜHRUNG?

BY REED BROCKWAY BONTECOU, M. D.,

Formerly Brevet-Colonel and Surgeon U. S. Volunteers, etc., Surgeon to Marshall Infirmary, Troy, N. Y.

It is the intention of this paper to consider more especially wounds and injuries incident to modern warfare, and the term "Resection" will be applied to the cutting off the extremities of long bones, and "Excision" to removal of portions of flat bones, and portions of the diaphyses of long bones.

The late American war, and the late European wars, furnish abundant material from which to estimate the value of resection or excision, compared with the expectant plan of treatment, or amputation, for wounds and injuries, and reference will be made to the statistics furnished by these wars, and from other sources.

The late American war furnished 13,000 gunshot injuries of the Head, 4,000 of which were shot injuries of the cranium, 2911 were fractures of both tables without depression, 264 were depressed fractures of both tables, 486 were penetrating, 73 were perforating, 328 were shot contusions, 138 were fractures of the outer table, only, 20 were of the inner table alone, 6 were punctured, and 49 were incised fractures. 320 of these were subjected to excision, with a mortality of 56 per cent. ; in 464 cases bones were removed, and portions elevated, without excision, with a mortality of 48.3 per cent.

It is not my intention to advocate meddlesome surgery, especially about the cranium ; but where there is a depressed fracture, or a contusion of the cranium from shot injury, followed by symptoms of compression, or mental disturbance of any kind, or persistent pain in the head, I think it justifiable and necessary to excise the skull, to give exit to any morbid products that may be within the diploë or within the cranium, and to relieve irritated meninges from possibly depressed inner table, or to remove a compressing clot ; and, where abscess of the brain is suspected, the membrane should be laid open, and, if necessary, the brain explored with a large-size aspirating needle.

The 17 shot contusions subjected to excision, in the late American war, gave a mortality of 75 per cent. This high mortality was doubtless the result, in many cases, of too great delay in performing the operation. For instance, William Attig, private, 49th Pennsylvania Volunteers, was wounded November 7th, 1863, by a musket ball, which struck the skull near the left frontal eminence, denuding the bone of its pericranium for about one inch ; he was admitted to hospital under my charge, November 9th, 1863, complaining of frontal headache ; his pulse was normal, his appetite poor ; November 17th, ten days after the wounding, he had a chill and vomited, and his eyes became suffused and lachrymose. These symptoms continued two days, when I excised a portion of the bone at the site of injury, and, in making the incision through the scalp, pus was seen to be oozing through the denuded bone. On removing the bone, a small quantity of pus was found between the dura mater and the skull. After the operation he was free from pain, but, on the night of the 20th he became delirious, and remained in a stupor until the 24th, when I incised the dura mater and gave exit to a small quantity of pus ; he died two hours after. I relate this case as an example of dilatory and inefficient treatment. His chances for recovery would have been much greater if operated on earlier.

I could relate several other similar instances, where I have regretted not operating sooner. In one case, that of Dennis Sullivan, with gunshot contusion of the os frontis, above the frontal eminence, chills occurred, which were mistaken for malaria; and death resulted from abscess of brain caused by fracturing and displacement of the inner table, which might possibly have been relieved by timely operative interference. The case is reported in the first volume of the Surgical History of the American War, page 148.

A case in point, is related in Hennen's Military Surgery, where Surgeon Cooper excised the skull for a simple shot contusion followed by symptoms of compression, and found the inner table fractured and depressed. Speedy recovery followed the operation. Excision of the skull has been practiced in a number of instances, during the last five years, for the removal of brain tumors, by Hale White and Victor Horsley, of England, Prof. Kroenlein, of Zurich, by Bennett and Goadlee, and by Hirschfelder and Morse, and by Weir, Birdsall and Seguin, of New York. McEwen recently excised the temporal portion of the skull for abscess, with success. All these recent operations were done with antiseptic precautions.

Prof. Thornly Stoker, of London, operated on a man, aged 50, who had sustained an injury of the head nine days before, and was hemiplegic on the left side with indications of intercranial hemorrhage; he was comatose, and had difficult breathing and deglutition, and was rapidly sinking. Excision of a large portion of the right parietal bone discovered a clot an inch thick, by four inches in extent, which was removed, giving consciousness and partial use of his limbs while on the operating table; in three days he fully recovered all his faculties, and remained well.

Depressed factures of the skull, in my opinion, justify excision as a rule, even if there be no marked symptoms at the time of cerebral irritation or compression, unless the depression be over one of the sinuses, where it might not impinge on the brain. Most of such cases, that are not operated on, are likely to suffer through life from a variety of disabilities, and, not infrequently, result in epilepsy or insanity. A case in point under my observation was that of John Kinchlow, private, 125th Pa. Vols., aged 42 years, who received a compound gunshot fracture of the right parietal bone, in its middle portion, March 31st, 1865, with marked depression, and, as no unfavorable symptoms presented, he was treated on the expectant plan, with simple dressings, and was discharged from the hospital, May 29th, 1865, doing well. After the close of the war this man reported to me every two years for examination for continuance of his pension; it was apparent that his mind weakened, and that he was easily prostrated by heat or exertion; whenever stimulants were taken, even in moderation, he became delirious, and, in one of these paroxysms, he walked into a river and was drowned. His skull is in the Army Medical Museum, and shows a depression of both tables, one-third of an inch in depth. Had excision been practiced soon after the wounding, his condition would probably have been better.

Penetrating gunshot fractures of the cranium are sometimes proper cases for excision. A notable example of this character was that operated on by Prof. Huber, of Bellevue Hospital, New York, in 1884, and reported in the New York medical journals. The ball, in that instance, entered the os frontis, and passed through the brain to the occiput, being deflected to its position in the posterior cerebrum. Excision of a portion of the occiput, and exploration of the brain, discovered the ball, and its removal was successful under antiseptic precautions and thorough drainage, and he made a good recovery.

Where the missile can be reached safely through the wound of entrance, it should be done. The operator will probably find it necessary to enlarge slightly the wound of entrance in the skull, as the extractor adds to the diameter of the missile.

A case in point was that of Lieut. Burd, aged twenty-six years, who was admitted to the hospital under my charge, February, 1872, with a fistula in the os frontis, the result

of a gunshot wound received seven months before. I dilated the fistula with a sponge tent, and discovered a lead bullet, embedded one and a half inches in the left brain. It was necessary to enlarge the wound of entrance in the skull somewhat, to extract the ball, which was split, and held in its cleft a fragment of the inner table. He recovered, and remained in the service, on modified duty. Many cases are reported where missiles were lodged in the brain, and carried, without serious disability, for years.

Punctured fractures of the cranium, if both tables are implicated, would be proper cases for excision, as the inner table is likely to be depressed. If the puncturing instrument has penetrated the brain to any considerable extent, the excision will ensure drainage, and allow of repositing the depressed inner table. The records of the late American war give six examples of this kind of fracture, with one recovery.

Compound fractures of the skull, from other than gunshot wounds, are almost always indication for excision; one hundred and seven cases reported by Prof. Dennis, of New York, treated by him antiseptically, give a mortality of 30 per cent. Most of these were cases of excision. Dr. Wiseman, of Zurich, reports ninety-five cases of compound fracture from injuries (other than gunshot) treated antiseptically, with the remarkably low mortality of 1.23 per cent., which goes to show that excision of bones of the head may be practiced with comparative safety, under antiseptic precautions.

Gunshot injuries of the shoulder-joint form a large percentage of the wounds received in war that are not mortal, and are of exceeding interest to the surgeon, from the fact that until comparatively recently, amputation was the only resource, where any operative interference was attempted. One thousand and eighty-six resections of that joint were performed in the late American war, with a mortality of 36.6 per cent. 1661 cases are reported by Prof. Gurlt, in his great work on resection, as occurring in all countries between 1792 and 1878, with a mortality of 34.70 per cent. The American cases are included in this number. Amputation at the shoulder joint gives a mortality of 29 per cent.

Primary resections give a mortality of 31.6 per cent.

Intermediary resections give a mortality of 46.4 per cent.

And secondaries a mortality of 29.3 per cent.

Five hundred and seventeen resections of the head of the humerus, with a portion of the shaft, give a mortality of 30.56 per cent.

Forty-three resections of the head of the humerus, with portions of the scapula and clavicle, give a mortality of 24.3 per cent.

Two hundred and seventy-two resections of the head of the humerus alone, give a mortality of 39.33 per cent.

Culbertson's Prize Essay tables, give, for resection of the shoulder for other injuries than gunshot, a mortality of 27.27, and for disease, 25 per cent. These observations are of cases not treated antiseptically.

Five primary resections of the shoulder joint for gunshot fracture are reported by Gurlt, as occurring in the Turco-Russian War; under antiseptic treatment, all recovered; six secondary resections, after unsuccessful expectant and drainage treatment, gave a mortality of 50 per cent. The recent results obtained by antiseptic treatment in gunshot fractures and resections have been exceedingly encouraging.

Reyer reports forty-six cases of gunshot fractures, involving the larger joints, treated conservatively by primary antisepsis, with a mortality of 14.8 per cent.—viz.: one shoulder, one hip, eighteen knee, and five of the foot. Also seventy-eight cases treated by secondary antisepsis, with a mortality of 61.5 per cent.—viz.: seven shoulders, eleven elbows, four of the hip, forty of knees, six of ankles, five of tarsus, and five of hand. Also, sixty-two cases, treated without antiseptic precautions, gave a mortality 77.4 per cent.—viz.: seven shoulders, eleven elbows, six wrists, four hips, twenty-three knees, and eleven ankles.

Nineteen resections of the shoulder joint, for shot fracture, operated on by myself in the American war, gave a mortality of 14.28 per cent. for the secondaries, and 70 per cent. for those operated on in the intermediary stage. Some of the latter class were in a feeble and unhealthy condition, and would probably have been better deferred to a secondary operation. No antiseptic precautions were observed.

It was considered a great advance step in surgery to be able to avoid amputation by resection of the shoulder, and we may reasonably hope for a still greater advance, in being able to avoid resection for many of the gunshot fractures of that joint, by strict antiseptic treatment from the commencement. Amputation need never be done for shot injury of the shoulder or upper arm, where there are soft parts and vessels enough remaining in good condition to keep the extremity alive, for, even with a flail-joint, the limb is useful in giving symmetry to the body, and leaving a tactile extremity, rather than a stump.

Very extensive comminution of the head of the humerus, with great destruction of soft parts, would be a condition justifying resection, as would also necrosis or caries of that bone. The great majority of gunshot fractures of the shoulder joint, which have heretofore been subjected to resection have, by Reyer, Bergmann, and others, been proved to show better results by the expectant plan of treatment, under strict antisepsis.

The usefulness of the limb, after resection of the head of the humerus, depends largely on the fact of anchylosis, which gives a very satisfactory result, as the scapula acquires, by use, very free motions, and although the upward movements of the arm are limited, still, it is infinitely preferable to a flail-joint.

In primary resections, the periosteum is generally sacrificed, especially if three or four inches of the shaft is removed, and there is generally failure to regenerate the bone, and the flail-joint, under these circumstances, is the rule. This might be prevented by wiring the shaft to the scapula, to favor anchylosis, and would be a certain method of securing apposition of the surfaces.

In performing the operation of resection of the shoulder, I have generally utilized the shot wounds, when favorably located, to make the incisions, and have not hesitated to divide the deltoid transversely through its attachment to the acromion, and never failed to get proper and useful union of the soft parts. Where portions of the clavicle or scapula are to be resected with the humerus, this incision has its advantages. Sabre and bayonent wounds of the shoulder, complicated with fracture of the joint, are not likely to require resection ; better results can be obtained by the expectant plans, under antiseptic precautions.

Gunshot fractures of the humerus, not implicating the joint extremities, have, in numerous cases, been subjected to excision. About 700 were thus treated in the late American war, with a mortality of 28.5 per cent. while 3000 treated on the expectant plan, gave a mortality of 15.2 per cent. only, and 2000 amputations gave 18.9 per cent. mortality.

While I advocate, in certain cases, limited excision in the diaphysis of the femur, to secure the fractured ends, I fail to see any necessity for excision in the shaft of the humerus, where we can command so much more perfectly the fractured bone by external appliances. Liberal incisions through the deep fascia, to relieve tension and facilitate drainage, the removal of detached fragments and foreign bodies, is all the operative interference required. Where the vessels and soft parts do not demand amputation, necrosis and disease of the bone justifies resection.

The Elbow joint has been resected in 1438 instances for gunshot injury, in all the wars up to 1878, according to the reports of Prof. Gurlt, with a mortality of 24.87 per cent.; 529 cases in the late American war gave a mortality of 22.4 per cent.; 938 cases, treated on the expectant plan, gave a mortality of 10.3 per cent.; 1024 amputations in the arm, for gunshot wound of elbow joint, gave a mortality of 24.3 per cent. ; and

according to the table of Culbertson, 477 resections of that joint for other than shot injuries gave a mortality of 10.59 per cent.; 402 for disease, a mortality of 10.87 per cent.; and for injuries of various kinds a mortality of 15.15 per cent. Fourteen resections of the elbow joint for shot fractures, operated on by myself in the American war, gave for the secondaries no mortality, and for the intermediaries 50.8 per cent., without antiseptic precautions.

The expectant plan of treatment, in gunshot and other fractures of the elbow joint, is the method promising better results, both as to mortality and usefulness; but if the joint be extensively opened, and the lower end of the humerus is comminuted, with or without fracture of either the ulna or radius, resection would be justifiable, providing the vessels and sufficient soft parts were in good condition. Extensive injury to the upper extremity of the ulna would also justify partial resection. Unreduced dislocation with anchylosis in a bad position, or anchylosis in a bad position from any cause, or chronic arthritis, caries, or necrosis, would justify resection, partial or complete.

In gunshot fractures, resection, if indicated, should be done primarily under antiseptic rules, and if not practicable, then it is better to defer it for a month, or until the inflammatory stage has passed, as more favorable results will be obtained in the secondary than in the intermediary stage. A number of resections of this joint, made by myself, in the intermediary stage, gave troublesome suppuration, and in some, secondary hemorrhages, although ultimate good results were obtained in most of the cases, and, in a few, movable joints. The surgeon, however, may justly be content with anchylosis in a favorable position.

Excision for gunshot fractures of the bones of the forearm was extensively practiced in this country during the late war. Nine hundred and eighty-six cases are reported with a mortality of 11.2 per cent. In fifty-nine cases both bones were excised. The ulna alone in 496 cases, and the radius alone in 413 cases. Amputation in forearm for gunshot fracture gave a mortality percentage of 13.9. The expectant treatment, in 3000 cases reported, gave a mortality of only 6.4 per cent.

Although the mortality for excision in this part is less than by amputation, it is nearly twice as much as by the expectant plan, and the results as to usefulness were not satisfactory, especially where the radius alone was excised, the hand remaining inclined strongly to the radial border. The vitality of this member is so great that, where the vessels and nerves are not badly damaged, we may trust largely to the efforts of nature, and injuries of extensive and severe degree will, in a majority of cases, make a satisfactory recovery under the expectant treatment, especially if antiseptic dressings are used, and the deep fascia freely divided where there is tension. The bones can be kept in proper position without much difficulty by external appliances. The hand, during treatment, should be kept with the fingers flexed, that in the event of fixation of the tendons these appendages may be left in the most natural and useful position. It has been a common practice to keep the fingers extended during treatment, and frequently permanent stiffness in that position has resulted.

Of the Wrist joint there are reported by Prof. Gurlt, in his work on "Resections," 133 cases of excision, as occurring in all the wars up to 1878, with a mortality of 15.15 per cent. One hundred and two of these in the American war gave a mortality percentage of 15.6. Seven hundred and sixteen shot fractures of the wrist joint, treated on the expectant plan, in the late American war, gave a mortality of 7.6 per cent.

Four cases of secondary resection, in the Turco-Russian war, reported by Gurlt; under antiseptic dressings, all recovered.

The mortality of resection of this joint, for other injuries than shot wounds, as given by Culbertson's tables, is 11.10 per cent., and for disease 11.76 per cent.

The cases of gunshot wounds of this joint that justify resection are rare, and only to be practiced where the bones forming the joint are comminuted badly; free incisions

through the fascia, to relieve tension, will enable the natural efforts to repair the most serious wounds. I made several resections of this joint for gunshot wounds in the intermediate stage during the late war, and some made good recoveries. The bones of the Hand seldom require primary excision ; removing detached fragments and foreign matter is all that is required, except as a secondary proceeding for necrosis and caries, and other diseases. Resection of the hip-joint, for shot injury, has been practiced on 72 cases in this country prior to 1879, and in Europe in 100 instances with an aggregate mortality of 86.5 per cent. For the primaries 93 per cent., for the intermediaries 96 per cent., and for secondaries 63.4 per cent.

269 cases, in the late American war, that were treated on the expectant plan, gave a mortality of 92.5 per cent., and 66 amputations at the hip joint gave a mortality of 83.3 per cent.

Resection for disease, in civil practice, according to Culbertson's tables, gives a mortality of 45.7 per cent., a majority being in young subjects. All these observations are of treatment not antiseptic. Dr. Yale, of New York, reports in the *Annals of Surgery* for January, 1886, 48 cases by Volkman, with a mortality of 25 to 30 per cent., and 33 cases by Korff, with a mortality of 48.48 per cent., and 166 cases by Gorsch, with a mortality of 36.7 per cent., and 36 cases by Alexander, with a death rate of 30.55 per cent. All of these cases were presumably of disease, and treated antiseptically.

In gunshot fracture of the Hip-joint, involving the head or neck of the femur, primary resection is, under certain circumstances, justifiable, even though there be injury of the acetabulum also. Three cases, with this complication, have been operated on successfully ; one by Surgeon Hoff, U. S. A., one by Dr. Schonburn, and one by Dr. Hufelder, of Germany. One resection done by myself, in the intermediate stage, during the late war, resulted fatally.

The propriety of resection will depend somewhat on the necessity for immediate transportation. If transportation is to be for any considerable distance, and in wagons, over rough roads, I should state that amputation would give the better chance for recovery, even though the soft parts were not extensively destroyed. If, however, the transportation is by rail or water, and it is practicable to apply a fixation bandage of plaster or glass, then resection should be practiced, if the head or neck of the bone is comminuted, or if the missile is lodged in the bone or joint. If the neck alone is fractured, without comminution, and the soft parts and vessels are in good condition, the case may be better treated on the expectant plan, under strict antiseptic rules, with thorough drainage, if possible, when suppuration occurs, and this course of treatment would apply to perforating shot wound of the neck of the femur, or trochanters, where the solution of continuity in the bone is not entire. After resection, anchylosis is the result to be desired, as giving the most useful limb and best support, and a fixation bandage that would keep the upper end of the shaft in contact with the acetabulum would be the best and most comfortable dressing. As regards the usefulness of the limb in resected cases, the results, in most cases, are not satisfactory. Anchylosis, which gives the best result, is seldom obtained. Those who recover from amputation, are much better able to help themselves, both as regards locomotion and occupation, than those on whom resection has been practiced.

Excision in the shaft of the femur is a proceeding condemned by many good surgeons. It has, nevertheless, been done quite extensively in this country during the late war, 175 cases having been reported by Surgeon Geo. Otis, U. S. A., in the Surgical History of that war, with a mortality of 84.2 per cent. 3767 cases of gunshot fracture of the thigh, treated on the expectant plan, during the same war, gave a mortality of 47 per cent., not under antiseptic dressings. 5 cases, reported by Reyer, from the Turco-Russian war, treated by antiseptic primary occlusion, gave a mortality of 20 per cent., and in 8 cases, treated by antiseptic drainage, all recovered.

Prof. Frederic S. Dennis, of New York, reports 53 cases of compound fracture of the thigh from injuries other than gunshot, treated antiseptically, in a civil hospital, with a mortality of less than 10 per cent. 6369 amputations of the thigh, in the American war, gave a mortality of 54.2 per cent. 3465 cases, from other wars up to 1876, gave a mortality of 50 per cent.

The reports of Bergmann, Volkmann and Reyer, of Germany, from the Turco-Russian war of 1878, concerning the antiseptic treatment of shot fractures of the extremities, would seem to indicate that primary antiseptic occlusion, or sealing together with plaster-of-Paris, or some kind of fixation bandage, is the treatment to be practiced. If this can be accomplished before the wound becomes septic, good results may be anticipated, but if suppuration becomes established, and there is difficulty in maintaining coaptation of the broken shaft (and there almost always is), then an operation tantamount to excision is a justifiable proceeding. That is, cutting down and securing the shaft by wire, as recommended by Surgeon Howard, U. S. A., or by small metal plates and screws, as practiced by Dr. Hausmann, of Hamburg, or, perhaps still better, by silk-worm gut, or chromicized catgut sutures. The liberal division of the deep fascia, and other tissues, for that purpose, would assist in procuring good drainage, and prevent the retention of morbid products. Thorough drainage, with antiseptic dressings, should be used.

I practiced excision on ten cases of gunshot fractures of the thigh, in the middle and upper third, after the battle of Williamsburg, in May, 1862. They had been subjected to rough transportation, and were in a very bad condition. They all proved fatal, from pyæmia and prolonged suppuration. Antiseptic surgery and wiring of bones was not practiced then, and I believe, if they had been used, a fair proportion of those cases would have recovered, with useful limbs. The autopsies on those who survived long enough for bone formation, showed that nature's efforts in that direction had been abundant, but, for want of proper coaptation, it was of no avail. Shot contusions of the femur generally result in necrosis of a limited extent, and, in some cases, osteomyelitis, which, it is suggested, might be prevented by early excision of the contused portion, without destroying the continuity of the shaft. This can be done with the surgical engine, with very little disturbance of the soft parts. 162 cases of shot contusions of the femur were reported, occurring in the late American war, 123 of which were treated on the expectant plan, with a mortality of 22.8 per cent., and 9 cases by amputation, with a mortality of 77.7 per cent.

Resection of the Knee-joint has, thus far, been almost as unsatisfactory as that of the hip joint. Prof. Gurlt, in his work on resection, reports 146 cases, occurring in wars up to 1878, with a mortality of 77.8 per cent. Otis reports 133 cases, from European wars up to 1877, with a mortality of 73 per cent. 57 cases from the American war, with a mortality of 81.4 per cent. 603 resections for disease reported by Culbertson, in his tables on resections, gives a mortality of 29.94 per cent. 28 cases of injuries other than gunshot, 45 per cent. mortality, and 53 cases for deformity, a mortality of 12.5 per cent.

Prof. A. M. Phelps reports in the *Medical Record*, July, 1886, 329 cases of resection of the knee-joint for disease, occurring in Europe and America since 1878, treated antiseptically, with a mortality of 9.42 per cent., and subtracting deaths from causes not attributable to the operation, lowers the mortality to 3.03 per cent., certainly an encouraging statement for antisepsis.

189 gunshot fractures of the knee with amputation at the knee, give a mortality, in the American war, of 56.6 per cent., and amputation in the thigh, in 2377 gunshot fractures of the knee, gives a death rate of 52 per cent., and 868 cases of gunshot fracture of the knee treated on the expectant plan, gave a mortality of 60.6 per cent.

12 cases, reported by Reyer, of gunshot fracture of the knee, treated by antiseptic

primary occlusion, in the Russian army in the Caucasus in 1878, all recovered, and six cases by antiseptic drainage, a 50 per cent. mortality. Reyer further reports 15 cases of gunshot fracture of the knee, with ball embedded in the bones, treated conservatively, by secondary antiseptic means, with a mortality of 93.3 per cent. 4 cases, treated by primary antisepsis all recovered. 9 cases treated without antiseptic precautions, all died. He furthermore gives a series of 46 cases of gunshot wound of the knee-joint; 18, treated by primary antisepsis, with a mortality of 16.6 per cent., and 15 recovered with movable joints. 19 cases, treated by secondary antiseptic means, gave a mortality of 85 per cent., and one stiff knee. 9 cases, treated without antiseptic precautions, gave a mortality of 95.5 per cent. Heintzel reports from the Franco-Prussian war, 529 cases of gunshot wounds of the knee joint, treated in a variety of ways, but not strictly antiseptic, with a mortality of 75.10 per cent. Volkmann reports, between 1873 and 1877, 132 major amputations with only four deaths; and Lister reports 80 major amputations, with a mortality of 2.5 per cent. Bergmann reports 15 cases of gunshot fracture of the knee, occurring at Plevna, in 1878, treated by primary antiseptic occlusion and plaster-of-Paris bandage, with 6.6 per cent. mortality only; in 5 of these cases the ball remained concealed in the joint, and in one, pieces of woolen clothing, which did not interefere with the healing—death subsequently, from other causes, revealed the fact. Bergmann further reports that the most extensive shot injuries of soft parts healed without suppuration under that treatment, but to obtain these results, scrupulous avoidance of interference with the wound, with either probes or fingers, must be observed, and occlusion and a fixation bandage be applied immediately after the wounding, to prevent suppuration, which is the important point to be obtained.

In view of these facts, it may be stated, that most gunshot injuries of the knee are either subjects for amputation, or for the expectant plan, under strict antiseptic precautions, if such treatment can be obtained.

If antiseptic occlusion fails to prevent suppuration, then open the joint freely on all sides, and treat by thorough drainage and antiseptic irrigation. The joint must be laid open so freely, that abscesses cannot form. Only one of three cases of resection of the knee, operated on by myself, in the late war, recovered with a useful limb, and that one was operated on two days after the wounding, the others, at a later period, when suppuration had been established.

If resection is done, it should be primary, if possible, and the opposed surfaces of the femur and tibia secured in apposition, either by wire or sutures, to ensure anchylosis, which is the most desirable result.

The bones of the Leg have been subjected to excision, for gunshot fracture, in the wars of Europe, in 152 instances, with a mortality of 69.7 per cent., and in 387 instances, in the late American war, with a mortality of 28.2 per cent.

3938 cases of gunshot fracture of the leg, treated on the expectant plan, gave a mortality of 18.5 per cent.

3708 amputations, for shot fractures of the bones of the legs, give a mortality of 34 per cent. for the American, and in 7637 cases in European wars, give a mortality of 73.8 per cent.

Prof. Dennis, of New York, reports 150 cases of compound fractures of the leg—not gunshot—treated in Civil Hospital, under antiseptic rules, with a mortality of 9.2 per cent. Although the mortality of excision in the leg is less than that of amputation, yet it is twice as much as that of the expectant treatment, and, independent of the mortality consideration, the unfavorable results, as to usefulness and deformity, render the practice undesirable, especially, as regards the tibia, unless as a secondary proceeding for necrosis, where bone formation may replace the part removed. Excision of considerable portions of the Fibula may be done, without interfering so much with the usefulness of the limb. Primary antiseptic occlusion should be practiced in gunshot

fractures of the leg, and if this fail to prevent suppuration, then make free division of the deep fascia, and drainage, with antiseptic irrigation.

Resection of the ankle joint has been done in European wars, from 1854 to 1878, in 150 instances, with a mortality of 33.92 per cent., according to Prof. Gurlt, and in 29 instances in the American war, with a percentage of 29.6 mortality. 1700 gunshot fractures of the Ankle joint, treated on the expectant plan, gave a mortality of 19.5 per cent. 161 amputations, at the ankle joint, gave a mortality of 25 per cent., and 17 secondary amputations, a mortality of 7.7 per cent. ; 271 cases, mostly from European sources, a mortality of 55.6 per cent. 4 gunshot fractures of the ankle joint, reported by Reyer, in the Turco-Russian war, treated by primary antiseptic occlusion, all recovered. 2 primary resections, under antiseptic treatment, gave a mortality of 50 per cent. 4 cases reported by Gurlt, of secondary excision after unsuccessful secondary drainage, with a mortality of 25 per cent. 285 cases of excision, for disease and injuries not gunshot, up to 1876, gave, for injuries, 34.84, and for disease, 10 per cent., not under antiseptic treatment. The lowest mortality, for any operation on the ankle joint, was for secondary amputation, 7.7 per cent. ; the lowest for excision, was 29 per cent., while a limited number (4) under primary antiseptic occlusion, or sealing, gave no mortality.

There are many cases where one or other of the Malleoli are injured, or where the astragalus alone is fractured, or where the missile is concealed in the joint, or in one of the bones of the joint, where partial resection would be indicated, and where the lower end of the tibia and fibula are comminuted Complete resection might be justifiable under antiseptic precautions, but I think the most life- and limb-saving practice is the expectant antiseptic, in all cases, unless the injuries are so severe as to demand amputation.

Schuchard, Staff Surgeon of Metz, recommends primary antiseptic occlusion in all wounds, until they reach a field hospital, and resection only when the missile is known to be concealed, or the soft parts extensively destroyed by large projectiles opening the joint. I think it advisable to observe this as a rule, if antiseptic dressings can be supplied, and properly applied on the battlefield.

## CONCLUSIONS.

1st. Gunshot contusions of the cranium, especially those destroying the pericranium, are cases that require close attention, and, on the occurrence of pain in the head, especially with febrile symptoms and mental disturbance, excision of the contused bone is justifiable.

2d. Gunshot fractures of the cranium, with depression sufficient to render it probable that the inner table is displaced and depressed, unless it be over the site of one of the sinuses, are causes justifying excision, even should there be no symptoms of cerebral irritation at the time.

3d. Gunshot fractures of the humerus, involving the shoulder joint, with extensive comminution of the head of the bone, justify resection, if the important vessels and nerves are not injured. If the comminution is not extensive, then removal of detached fragments and foreign bodies, and making the wound aseptic, and treating antiseptically, without resection, is advisable; the same conclusion applies to the elbow and wrist joints.

4th Gunshot fracture of the hip-joint, comminuting, or fracturing the head of the femur, or with the missile impacted in the head or neck of the bone are cases for resection, provided, the great vessels and nerves are uninjured, and the soft parts not extensively destroyed ; and provided the man is not to be subjected to rough transportation for any considerable distance. Thorough drainage is necessary, if resection is practiced.

5th. Gunshot fractures of the knee-joint, with missile embedded in the lower end

of the femur, or in the articular end of the tibia, or with comminution of the extremity of either of these bones, would justify resection, with thorough drainage, provided the important vessels and nerves are uninjured.

6th. Gunshot fracture, with comminution of the lower extremity of the tibia, involving the articulation, justifies resection; provided, the important vessels and nerves are uninjured. Antiseptic treatment is a necessity in all cases.

7th. In comminuted gunshot fractures of the diaphysis of the femur, excision is justifiable, for the purpose of securing, by metal plates, or metal or gut sutures, the fractured extremities. Strict antisepsis a necessity, in all cases.

### DISCUSSION.

Brevet-Colonel H. E. GOODMAN, formerly Colonel United States Volunteers, reported seven cases of resection of the shaft of the femur, after the battle of Chancellorsville, May 3d, 1863, treated in 12th Army Corps Hospital, at Aquia Creek, with everything thought necessary, that money could buy. All died; one, in hospital at Aquia Creek, and the other six, in a Washington Hospital. These resections were made in accordance with a Circular of Surgeon-General Otis, recommending resection. My conclusion then, was, that it was a bad operation, and should not be performed.

Dr. GOODMAN asked Colonel Bontecou, if he had resigned his brevet commission, and, getting a reply that he had not, recommended to the Surgical Section on Military Surgery, that the word "formerly," only be used, where such commission has been resigned.

By Act of Congress, the title is for life, and has certain advantages, as allowing us to certify on honor, instead of on oath, before the Government.

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## AMPUTATION FOR INJURY OF LIVING PARTS NEVER NECESSARY.

QUELLE QUE SOIT LA BLESSURE, L'AMPUTATION DES PARTIES VIVANTES N'EST JAMAIS NÉCESSAIRE.

DIE AMPUTATION VERLETZTER, NOCH LEBENDER THEILE IST NIEMALS NOTHWENDIG.

BY ELISHA H. GREGORY, M. D., LL. D.,

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Obviously, surgery can have but one aim, the conservation of the human body—the application of the head and hands for the preservation of life and limb. Surgery must always antagonize mutilation; be ever ready for a compromise, whereby the original constitution and frame—as from our Maker's hands—may be kept as nearly as possible in its normal condition. The thoughtful surgeon waits upon nature, realizing how difficult it is to guide or coerce her; applies himself to learn her methods—knowing that her laws are constant—that he may turn her plans to his advantage, rather than turn his plans to her advantage.

Away! away!! with the word "conservative" in connection with surgery, implying the acceptance of some system essentially radical and revolutionary. Let it go

with the expression "rational medicine," implying the existence of a converse practice. When a part is killed by violence, or diseased beyond reclaim, nothing is left but the comparatively commonplace, meanest operation of surgery—amputation. The great boast of modern surgery, the triumph of the last ten years,—comparable to which there is no parallel in the history of our high calling,—is based on the discovery of new methods of conservation.

It is, perhaps, in the increased knowledge of the treatment of wounds that the true philosophy of surgery has been most evinced in recent times. The maxim "all wounds are dangerous" is spent. In its stead comes the declaration "No one should die of a wound," unless its severity *directly* destroys life. No one injured or operated on, should perish through secondary inflammation developed from the wound. Every loss of this kind is a fault of treatment. Again, injury does not directly determine inflammation; the series of events following injury is not inflammation; traumatic reaction, with its inevitable heat, sense of uneasiness, with its associated redness, fullness and swelling, is mechanical, chemical, representing emergency physiology, no disturbance of its processes, simply a concentration of salutary forces, marshalled for a beneficent purpose. Damage from violence, heat or chemical causes, exalts the cell processes; does not vex and confuse them. Physical causes can only effect physical results.

Surgery is now ready to assume, that injury is not a warrant for the removal of a living part; the problem of its security is now solved, that all those countless disasters and disturbances, formerly inevitable to open wounds, can be controlled. Life is now a guarantee of repair, not a menace, at once dooming the injured part and jeopardizing life. And why? Strange though it be, fermentation, which helps us to our bread and our beer, is the culmination of open-wound calamity. The real noxa is a vital agency, demonstrated beyond equivocation. This vital agency—septic organisms—exists everywhere, revels in dirt, and is as universal as mankind.

It is now settled, that the most severe injuries can be inflicted without inflammation; foreign bodies, disinfected, may remain indefinitely, even in the peritoneal cavity, without inflammation. Fermentation and infection are one; no inflammation without infection; no more laudable pus. Now, all wounds are closed wounds, aseptic methods practically substituting the skin. Now, all cell processes may be fostered, may pursue, untrammeled, their natural bent, making haste to repair, utilizing all their forces; favored by all the tributary influences afforded by an undisturbed, uninfected general system.

Reverse life for ten years; think of the absolute certainty of infection of all open wounds, the local suffering, the general peril, protracted indefinitely in the midst of a dread uncertainty.

Thanks to a merciful Providence, surgery is delivered from the domain of chance. The surgeon no longer stands helpless, powerless, before a wound he has honestly inflicted; he dismisses dread as to results; that painful suspense between fortune and misfortune is gone. The practical surgeon is the master of the situation; he not only proposes, but he disposes; his prescriptions are practical certainties; his teachings embrace at once a knowledge of the origin, nature and fate of his once mysterious enemies; as also of the conditions which prevent and destroy their baleful consequences. Hereafter, knowledge and ignorance, capacity and incapacity, care and carelessness, cannot occupy an equivocal relationship in our renowned profession. Nor is the triumph limited to prophylactics, for antiseptic treatment is relatively as important and satisfactory, after the victims of the injury have been overtaken by putridity.

Let us not forget that the treatment is difficult, requiring patience, and imposing the utmost responsibility, but with it comes the solace of confidence in results. Wound malignancy is of the past; knowledge, skill and scrupulous care are sure of reward. Contemplate a model modern surgical operation. It may be painless, bloodless and

feverless; it may involve the great cavities, embrace joints and marrow; it may be in the young or the old, the robust or the decrepit, the scrofulous or the syphilitic, and, withal, as harmless as a corresponding subcutaneous injury. Think of it! All the outcome of the discovery of the microbic nature of wound diseases includes the later discovery, that the real cause of inflammation is a vital agency. Certainly physical causes do not disorder physiological processes; however much intensified or protracted, there is no cell perturbation. The changes incident to physical causes are local, never infective, harmless; cell action can alone disturb cell processes. The too-cunning cell eludes methods of physical agencies. On the other hand, infection implies cell antagonizing cell, a clash of cell subtleties; a war for self-preservation, victory or death.

The control of wound diseases is the pivotal point of surgical decisions, regarding the treatment of injured parts. The question settled, the duty of saving injured parts is established; the discussion ended. Living parts must repair, barring accidents. Physical injuries produce quantitative changes in the involved parts, nothing more, changes that promote repair. Specific or vital injuries determine qualitative changes, which become obstacles to repair.

The real accidents to wounds are shock, fat embolism, venous thrombosis and pulmonary embolism, unfortunately beyond our control. Infective and putrefactive changes are not accidents, but the inevitables of open injuries; but, fortunately, within our control. Thus, it follows that the limits in which amputation may be resorted to are exceedingly narrow, the great step in the march of modern surgery. Now, general injuries of limbs alone doom. Bones being broken, arteries and nerves twisted and torn, muscles crushed—in short, the limb killed—mutilation is inevitable. Life, or the possibility of life, in an injured limb, implies limited injury. The main vessels may be spoiled, the member pulseless; yet, if the injury is not general, the collateral currents will revive the circulation. The destruction of the large nerve trunks is no excuse for amputation; bones will unite normally in paralyzed subjects; besides, the continuity can be reëstablished by suture. Large venous trunks peril by infiltration and decomposition; proper disinfection disposes of this danger. The rupture of the principal artery may demand the ligature, but, unless the destruction is general, life may be established by the collateral circulation.

The question of secondary amputation is no longer entertained, assuming that the case is seen in the beginning. Buried sutures securing nerves, muscles and bones; asepsis in all its possible details, perfect fixation, etc., exclude the question of mutilation.

The surgery of to-day contemplates amputation most remotely; recognizes the possibility of primary amputation; but the wound inevitables which determine secondary and consecutive amputations are now anticipated and prevented. All that has been written about open fractured bones, lying deep among lacerated muscles, suppuration progressive in character dissecting up spaces, involving medullary cavities, and pus-bathed fragmentary tissue, has become obsolete—is remembered only as a legend.

# WHAT CONDITIONS ON THE FIELD JUSTIFY AMPUTATION IN GUNSHOT WOUNDS?

## QUELLES SONT LES CONDITIONS QUI JUSTIFIENT L'AMPUTATION PAR SUITE DE COUPS DE FEU SUR LE CHAMP DE BATAILLE?

## WELCHE UMSTÄNDE AUF DEM SCHLACHTFELDE RECHTFERTIGEN DIE AMPUTATION NACH SCHUSSWUNDEN?

BY E. GRISWOLD, M. D.,

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I. Amputation on the field, in military practice, cannot always be done, although the established rules of surgery, as well as the opinion of the surgeon, may, and do demand it, in many cases in which it is not done. The exigencies of war often separate him from his equipments, and deprive him of the means of action, or he may be overworked, and unable to do all that lies before him.

II. When cases of shot injuries of the extremities are presented to the surgeon, during the progress of a battle, or soon after its termination, the first consideration is, whether there are any severe body complications, and whether the injuries to the soft parts are such as to require immediate amputation.

III. If there be injury to the bones in their diaphyses of a serious degree, or of the epiphyses in any degree, the question will be, whether immediate excision or amputation is absolutely demanded ; and, in answering this question, each case should be subjected to the illuminating power of a full knowledge of the surgery of to-day.

IV. The surgery of to-day, and of the future, makes it necessary for military surgeons to be supplied with the means by which asepsis can be practiced, in the treatment of wounds, and this can be done, and made practical, wherever an adequate supply of water is attainable, if a rapid method of filtration and purification is available.

V. The possibilities of antiseptic surgery are already largely developed, and the military surgeon, of the present and future, must know what is to be expected in the way of conservation, and when his patient, having a severe shot wound of his extremities, is found to be clearly beyond the reach of conservatism, he is not only justified in amputation on the field, but it is his bounden duty to do so.

The last fifteen years have developed greater advances in the science and art of surgery, than any fifteen generations prior to the *renaissance*. Hygiene has been reinforced by antiseptic methods, the possibilities of surgery have been largely increased, and its mortality largely diminished.

Hospitalism is already becoming a thing of the past, and many surgeons, rejecting antisepsis formally, are practicing it informally, and we cannot but believe that their views of the necessity of excluding disease germs have been strengthened, and their methods modified by antiseptic doctrines.

A new era in surgery is now advancing in the morning of its triumph. Suffering humanity is to be freed from the deadly, ubiquitous microbe, whose rapid colonizations in our wounds destroy or delay their healing powers, corrupt the fluids of our bodies, and put our lives in jeopardy.

This new era brings a new surgery. And now the status of antiseptic surgery is such, that its application to military practice can scarcely be neglected. Science has developed antiseptic surgery, and science will, no doubt, work out the problems necessary to make its application to military practice on the field available. The obstacles encountered by Prof. Bergmann, in the Turco-Russian war of 1877, are already overcome, and the partial use he made of the method, gave excellent results, in his thirty-

one cases of shot fractures of the knee joint. Being equipped, then, for the complete application of antiseptic dressings, we have a new and important factor to be used in the decision of the question of conservation, excision, or amputation, in each individual case of severe shot injury of an extremity. The statistics of other wars, and the massive statistics of our own civil war, furnish data which may be considered the best (statistical) guide hitherto presented to the military surgeon; but the aid supplied by statistics is somewhat defective. They furnish generalities, but are not always sufficiently minute and accurate in their descriptions of original lesions, and in following out their sequellæ. Occasionally, too, the identity of cases is erroneous, and descriptions misapplied.

The classification of operations into primary, intermediate, and secondary, adopted by the editors of the Surgical History of our civil war, will be used in this paper. The *primary* period being within forty-eight hours of the receipt of the injury. The *intermediary* within thirty days from the termination of the primary, and the secondary at any date afterwards. The classification is intended to represent one normal and two pathological changes, the first, or normal, being that of reaction, the second (pathological) of inflammation, and the third (pathological) of subsidence of inflammatory action. The writer assumes the rule of action for the military surgeon in the field to be, to amputate primarily, whenever the circumstances in which he is placed at the time will admit of it, if the wound of the extremity is of such a severe character as to preclude the possibility of a recovery with a more or less useful limb. The surgeon will often find it a most difficult task to decide what to do, when, during or after a battle, the soldier with a shattered limb, and may be also a body wound, is presented for treatment. He appreciates the fact that he is not dealing with physics in their ordinary dynamical exemplification, in which results can be calculated with accuracy, but with bodies, whose endowments, while similar to those of their fellows, are, nevertheless, not only liable but likely to possess personal differences and peculiarities, of a character and influence on the individual, while passing through a severe traumatism, that may make all the difference between recovery and death. Some men are very susceptible to mild poisons, such as the bite of a mosquito, flea, or bedbug. Some suffer much more than others from slight injuries of the skin, such as abrasions, punctures or incisions. These are seeming bagatelles, but if they point to the recuperative powers of the individual soldier in question, they may have some value in deciding between conservation and excision or amputation.

Referring to the Upper extremity, we may say that primary amputation may be done—

1. When the arm is nearly or quite torn off by a large shot, either at the shoulder joint or below it.

2. When with a fractured humerus, the brachial artery with its veins, or the median nerve or other nerves, with the muscles, are so torn as to cause extensive and irreparable loss of tissue and loss of function.

3. When, with extensive destruction of the soft parts, the humerus is splintered the greater part of its length. When this class of cases cannot receive attention during the primary, they should be operated on as early as possible in the intermediary period, with the hope that antiseptic dressings may arrest the septic processes already begun, prevent further ravages, and give the patient a chance to react.

Of eight hundred and fifty-two * amputations at the shoulder joint, for shot fractures, four hundred and ninety-nine were primary, with three hundred and sixty-eight recoveries and one hundred and seventeen deaths (and fourteen undetermined cases),

* See Part 2d Surg. Vol., "History of our War," page 614, Table XLII.

giving a mortality among the determined cases of 24.1 per cent. Among the recovered cases six were complicated with injuries of the scapula.

One hundred and fifty-seven of this list had intermediary amputations, with eighty-five recoveries and seventy-two deaths, or a mortality of 45.8 per cent.

Sixty-six had secondary amputations, with forty-seven recoveries and nineteen deaths, or a mortality of 28.7 per cent. The remaining one hundred and thirty cases of this group were not designated as to date of operation, and gave a mortality of 23.5 per cent.

In eight hundred and seventy-six * determined cases of excision of the shoulder joint after shot injury, five hundred and eighteen were primary, with three hundred and fifty-five recoveries, or a mortality of 31 per cent. Two hundred and twenty-four were intermediary, with one hundred and twenty recoveries, or a mortality of 46.4 per cent. Ninety-two were secondary, with sixty-five recoveries, or a mortality of 29.3 per cent.†

In five hundred and seventy-seven shot injuries of the shoulder joint treated conservatively, seventy opened the capsule without injuring the bone. In the remaining five hundred and five cases the humerus or scapula was injured.‡ The aggregate mortality of these cases was 25.1 per cent., of the excisions 36.6 per cent., and of the amputations 31.1 per cent.

Of eleven hundred and eighty-four cases of injuries involving the shoulder joint, taken from the records of foreign wars, from the Revolution of Paris in 1830, to the Franco- (Prussian) German war of 1870-71, there were six hundred and thirty-three amputations at the shoulder joint, with a mortality of 54.8 per cent., and three hundred and seventy-eight excisions, with a mortality of 42 per cent., and one hundred and seventy-three were treated conservatively, with a mortality of 49.7 per cent.

The death rate of the whole number (1184) was fifty per cent. No statistics will be offered explanatory of the results of amputations of the humerus in its continuity, but it may be stated, as an opinion, that in the future nearly all shot wounds of the shaft of that bone will be treated either by conservation or amputation.

Of twenty-six hundred and seventy-eight cases of shot fracture of the bones of the elbow joint, nine hundred and thirty-eight were treated by conservation throughout, with a mortality of 10.3 per cent. Of these, two hundred and and eighty-five returned to some form of duty. Five hundred and twenty-nine were treated by excision, with a mortality of 22.4 per cent. Of these, eighty were returned to modified duty. Sixty-four were treated by excision and subsequent amputation of the arm, with a mortality of 39 per cent. Of these four were assigned to a modified form of duty.

Six cases had primary amputation at the elbow joint, with a mortality of 16.6 per cent; eleven hundred and twenty-four had amputation of the arm, with a mortality of 24.3 per cent. Of these one hundred and nine afterward did some kind of duty.

Seventeen had amputation of the shoulder joint, with a mortality of 23.5 per cent. At least two hundred and fifty of this group of 2678 cases of shot fracture of the elbow joint were treated for a time by conservation, with intermediary or secondary recourse to excision; and a large but determined number with intermediary or secondary recourse to amputation.

There are some notable features presented by this group—2678—in the large mortality in those intermediary and secondary amputations in the shaft of the humerus, as compared with the results of primary sections of that bone, and as compared with primary amputations at the elbow joint.

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* See 2d Surg. Vol., Hist. of Civil War, page 599, Table XXXIX.

† See 2d Part Surg. "Hist. of our Civil War," page 660.

‡ See 2d Part Surg. "Hist. of our Civil War," page 661, Table LIII.

As shown above, the mortality of eleven hundred and twenty-four amputations in the arm for, consecutively to, shot fractures of the elbow joint, was 24.3 per cent., but the mortality of thirteen hundred and thirty-eight primary amputations of the upper third of the humerus was 13.6 per cent., showing a numerical difference between the results of consecutive operations in the continuity of the humerus for shot fractures of the elbow joint, and primary amputations of the upper third of the humerus for shot fractures of that bone, of one hundred and forty-three lives (out of the 1338 cases), and a difference in the percentage of mortality of 10.7 per cent. Nine hundred and thirty-eight cases of this group of 2678 shot fractures of the elbow joint, treated conservatively throughout, with a mortality of 10.3 per cent., are not here compared with the results of amputations, inasmuch as there is reason to believe that all such cases, and many others, such as have hitherto been treated by excision, can be successfully treated in the future without operative interference.

Turning to the lower extremity, we find that three hundred and eighty-six cases, diagnosed as shot fractures of the hip-joint, are recorded on the returns of the two armies during our civil war.* The following is a summary of their treatment and the results :—

Three hundred and four cases were treated by conservation, of which fifty-five recovered and two hundred and forty-four died—a mortality of 81.9 per cent. Fifty-five were treated by excision, of which two recovered and fifty-three died—a mortality of 96.3 per cent. Twenty-seven were treated by amputation, of which two recovered and twenty-five died—a mortality of 92.5 per cent.

Of sixty-six amputations of the hip-joint, collected from the records of our civil war, thirty-nine were for injuries lower down the limb.

Twenty-five were primary, with three recoveries and twenty-two deaths—a mortality of 88 per cent. Twenty-three were intermediary, with no recoveries. Nine were secondary, with two recoveries and seven deaths, or a mortality of 77.7 per cent. Nine were re-amputations, with six recoveries and three deaths, or a mortality of 33.3 per cent. There is some difficulty in giving these numerical results their intrinsic value.

The conservative method seems to show better results than primary amputations, by seven per cent., but it must be stated that a careful and exhaustive search through the records of these cases (55) of recovery, taken from Table IX, of volume III of "The Surgical History of our Civil War," made subsequently to its first publication, shows that a large proportion of them were not fractures within the capsule. Excluding this large proportion, the mortality is increased to 98.8 per cent. Excisions show a better result than intermediary amputations (whose results are nil), by 3.7 per cent. Secondary amputations give better results than primary, by 11 per cent., and reamputation better than secondary, by 44.4 per cent.

This difference between the results of primary and secondary amputations at the hip-joint would seem to encourage the surgeon to practice conservation in every case in which, with the aid of the new surgery, there is a reasonable hope of reaching the secondary stage; where amputation offers so much better chances for life. Some surgeons have believed—Billroth among them—that all cases treated conservatively, or by excision in the beginning, should be so classed to the end, as amputation is now generally made the scapegoat for the failures of these methods. This remark hardly applies to shot injuries of the hip and upper third of the thigh, where conservative results in the future will, in every probability, surpass those of primary amputation, by a greater percentage than we now have. Applying this mode of enumeration, however, to the results, in the treatment of shot fractures of the femur, in its entity, we have a

* Part 3d, Surg. Hist. of our Civil War, page 65, Table IX.

mortality of 49.8* per cent. of primary amputations, as against 49.9 per cent. of cases treated conservatively throughout—a slight difference in favor of primary amputation. In military practice, amputations at the lower third of the femur give better results, than at the knee joint. Out of two thousand, eight hundred and eighty-one determined cases of amputation at the lower third of the femur, primary, intermediary and secondary, the aggregate mortality was 53.6 per cent.; of the primary cases, 48.7 per cent.; intermediary, 69.9 per cent.; and secondary, 48.3 per cent., while one hundred and eighty-seven determined cases of amputation at the joint, for shot injuries, gave an aggregate mortality of 56.6 per cent.; primary, 53.2 per cent.; intermediary, 68 per cent.; secondary, 53.8 per cent. Fifty-four of these 187 cases were for lesions of the knee joint, the remainder for injuries lower down. Of 54 determined cases of excision of the knee joint for shot fractures, there were 44 deaths and 10 recoveries—a mortality of 81.4 per cent. Out of three thousand, three hundred and fifty-five cases of shot fractures of the bones of the knee-joint, eight hundred and sixty-eight were treated conservatively, with a fatality of 521 cases, or 60.6 per cent. The mortality of 2399 amputations in the thigh, in its different divisions, for shot wounds of the knee-joint, was 51.1 per cent.; fifteen hundred and twenty-five of these were primary, with a mortality of 43.8 per cent., and eight hundred and thirty-nine intermediary and secondary, with a mortality of 63.4 per cent. From these data, it appears that the mortality of the eight hundred and sixty-eight cases of shot wounds of the knee-joint, treated conservatively, exceeds that of primary amputations of the thigh, for the same injuries, by 16.8 per cent., and that, of the 54 determined cases of excision of the knee-joint, for shot injuries, the mortality exceeds that of primary amputation of the thigh, for the same injuries, by 30.3 per cent., and that, of the one hundred and eighty-seven determined cases of amputation of the knee joint, the mortality exceeded that of primary amputation of the thigh, by 5.5 per cent. These data are based on a sufficiently numerous list of cases to enable us to arrive at a reasonably correct rule for our guidance in the treatment of severe shot wounds of the knee-joint, and, unless the new surgery can modify results favorably, we may conclude that all severe shot injuries of the knee-joint should be treated by amputation of the lower third of the thigh, for the mortality following attempts to save the leg by expectant conservative treatment, by excision, or by amputation at the knee joint, is too great, considering the excellence of the prothetic appliances now attainable, to compensate for the extra risk of life incurred in trying to preserve a crippled leg, or a knee stump.

While better results are to be expected from the application of the new surgery to military practice, it partially disturbs our maxims defining the conditions requiring primary amputations, but it does not modify the maxim to amputate on the field, whenever amputation is assuredly necessary, and the conditions† requiring amputation as specified by the Editor of the "Surgical History of our Civil War" can be accepted as eminently conservative, viz:—

1. "Where the thigh is torn off, or the upper extremity of the femur comminuted, with great laceration of the soft parts, in such proximity to the trunk that amputation in the continuity is impossible.

2. "When a fracture of the head, neck or trochanters of the femur is complicated with a wound of the femoral vessels.

3. "When a shot fracture, involving the hip-joint, is complicated with a severe compound fracture of the limb lower down, or by a wound of the knee-joint."

The most careful and critical efforts should be made, by surgeons in the field, to make an accurate diagnosis of the extent of hip-joint injuries, a result oftentimes far

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* See page 341, part 3d, "Surg. Hist. of Civil War."

† Third Vol. "Surg. Hist. of Civil War, U. S. A."

from easy of accomplishment, but, when accomplished beyond doubt, there being no fatal wound of the head or trunk, each case falling within the scope of one of these three categories should, if practicable, be amputated as soon as reaction occurs, and hip-joint injuries should take precedence over other cases. A well-dressed stump can be transported to a permanent hospital, or elsewhere, with far more satisfaction to the surgeon, and far more comfort to the soldier, than a mangled limb.

## DEBATE.

The two preceding papers were discussed together, Dr. J. McF. GASTON, of Atlanta, Ga., opening the discussion on the paper of Dr. Griswold, with the following remarks :—

He was pleased to note that, by the statistics presented, in regard to the greater percentage of mortality from secondary amputations, the impression left upon the members of the Section, by the views of Dr. Gregory, as to extreme conservatism in refraining from amputation, would be corrected. Facts are stubborn things, and if the attempt to save limbs leads, as stated, to the necessity of operations—subsequently—which are attended with greater fatality than early operations, we are warranted in concluding that the failure to amputate at all, must entail fatal consequences of a still larger proportion. In considering the practicability of saving limbs, when the principal blood vessels and nerves have been injured, in addition to fracture of the bones and laceration of the muscles, as from pieces of shell, in a battle, we must take into account the surroundings of the patient, and his being subjected to many drawbacks not met with in private practice. Transportation of the wounded greatly aggravates their injuries prior to amputation, whereas there is little disturbance after removal of the limb; and the prospect of undergoing the wear and tear of transportation in an ambulance, over a rough road, necessitates an operation in many cases, which, otherwise, would not call for it.

Dr. E. A. WOOD, of Pittsburgh, Pa., said, it is with diffidence that I raise objection to the teaching of so eminent a man as Dr. Gregory, of St. Louis, but his declaration, that amputation is not a question for consideration, and that, under antiseptic treatment, all wounds formerly held as demanding amputation will heal, is so extraordinary, and so opposite to what is the prevailing judgment in America, that I venture to call in question his teaching on that point, if for no other reason than the fear that the world may be led to believe that American surgeons allow conservatism to run away with their judgment, and I think a protest should be made against such a radical and sweeping declaration. Want of time will prevent even a superficial argument against the proposition. Dr. Gregory seems to teach that septic poisoning is always the cause, where evils follow wounds. Has he forgotten, or does he ignore that a person injured may die of shock, hours before sepsis is possible? Has he never had a case wherein amputation was the all-absorbing question of the moment? There are conditions when all other questions must be solved after amputation. In lacerated wounds around the knee, especially, where not only main arteries are severed, but where destruction of tissue precludes all hope of collateral circulation, amputation alone must be considered, and that surgeon is derelict who shuns this duty. Again, in a perforating wound, with destruction of the tissues of the knee-joint, complicated with severe laceration of the leg and foot, amputation must be seriously considered, and, in most cases, resorted to. In tetanus, amputation is sometimes necessary. In all injuries of the fingers, where tendinous and bony anchylosis is sure

to ensue, bringing about disability of the hand, because of useless and interfering fingers, it is wise—it is best—to seriously consider amputation.

Dr. BONTECOU, of Troy, N. Y., stated that he was a conservative surgeon, before the war, during the war, and advocates that practice still, believing that, when there is an artery left in good condition, and veins enough to return the blood, the prospect of saving an extremity is possible, especially if it be an upper extremity. The prospect in the lower extremity is, of course, different. He presumed that he had sacrificed many lives in efforts to save limbs, and would not recommend the practice to be carried to the same extent, under the same circumstances, that is, without antiseptics. Since the use of strict antisepsis in surgery, conservative surgery can be carried to an extreme degree not before justifiable. He related the case of a man who had both ankles run over by a loaded railroad freight car, comminuting them to an extreme degree. He put the man in a coffin, and packed his extremities in bran, and, although he had, for three days, violent delirium tremens, he recovered perfectly, and for thirty years succeeded in earning his living by sawing wood, and walks now without cane or crutch. Anchylosis of the ankles and tarsi was the result.

Dr. COLLINS, of Philadelphia, said: The question of amputation, in case of wounds of the knee-joint and compound fractures, was, during my army experience, often decided by the possibilities of transportation. Wounded, and those suffering from this character of wounds, always suffered severely by transportation, and often died of exhaustion, when, if amputation had been practiced, there would have been less suffering, and a better condition for recovery.

Antisepsis is not always infallible. I have seen two pistol-shot wounds of knee-joint, both treated with great care, and, under careful antiseptic dressing, after thorough irrigation; one did remarkably well, while the other did badly, showing that there must be other causes for death.

Dr. H. H. BIEDLER, of Baltimore, remarked: When to do amputations, after gunshot and railroad injuries of both limbs, is an important point, since, in the treatment of three cases, with no symptom of shock present, the results were unsatisfactory. In one case, a man, æt. 24, had his feet and lower portion of the legs mangled by a train; five hours after the accident, both legs were amputated, one at the knee, and the other four inches below. The patient stood the operation well, and lived twenty-four hours; laughed and talked and died suddenly, with no unusual symptoms. 2d. A boy, of 10 years, had both limbs mashed, to the knees; amputation was practiced through the middle third of both thighs; the patient did well for twelve hours, and died. 3d. A man, of 30 years, had both feet and one leg, to the middle third, mangled. Conservative surgery was suggested, and practiced for nine days, when one foot was amputated, through the middle third of the leg, the patient living only five hours. The colored race bears railroad and gunshot injuries better than the white race. Why there was not some decided symptom of shock, is a question, unless there is some hidden pathological condition present, of which we do not have the symptoms. All three cases were white.

Dr. GRISWOLD closed the discussion by stating that shock in injuries of the knee-joint, seemed to be more serious than in wounds of the knee-joint. When the injury is such that amputation is clearly indicated, it should be done early, and yet conservative surgery is available under certain precautions such as were not possible before an antiseptic course of treatment was adopted.

# TYPHUS FEVER IN THE CAMPS, HOSPITALS AND PRISONS OF OUR CIVIL WAR.

## TYPHUS DANS LES CAMPS, LES HÔPITAUX ET LES PRISONS PENDANT NOTRE GUERRE CIVILE.

## DER TYPHUS IN DEN LAGERN, HOSPITÄLERN UND GEFÄNGNISSEN WÄHREND UNSERES BÜRGERKRIEGES.

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The fevers that prevailed in our camps during the war of 1861–65 were :—

1. Measles, recognized by its sequence of symptoms—its fatality due to its pneumonic complications rather than to the virulence of the primary disease.

2. Typhoid fever, recognized by its progress from day to day, and from week to week; fatal by intestinal hemorrhage or perforation, pneumonic or cerebral complications; in the later stages by exhaustion, and in the earlier stages, sometimes, by the very fulminance of the morbid influence.

3. Malarial fevers, intermittent, remittent, and pernicious or congestive, readily known by their paroxysmal character and their amenability to specific treatment.

4. Typho-malarial fever, recognized, clinically, by the irregular type of its febrile action and a conjunction of more or less of the symptoms of its morbific elements, and, pathologically, by changes in the agminated and solitary glands; but confounded, clinically, with remittents and sub-continued malarial fevers, associated with so-called typhoid symptoms, and, statistically, with all idiopathic febrile manifestations of a continued type not typical cases of the typhoid affection of Louis.

5. Pneumonic fever, or, to give it the old term, typhoid-pneumonia, in which the solidified lobes of the lungs formed so prominent a feature.

6. Cerebro-spinal fever, with its rapid progress to death by way of chill, headache, jactitation, tetanic spasms and coma.

And, lastly, Typhus.

As a rule, with the exception of the last, these were readily recognized, clinically or pathologically, by the features which I have indicated in enumerating them. Some confusion existed where the typhoid and malarial fevers overlapped; but with that, at present, we are not concerned.

Some of these fevers affect the system but once, so that when the young soldier has satisfactorily recovered from their attack, he becomes exempt from all physical ills, except such as result from the wear and tear of life under the unhygienic influences of camps and campaigning. Similarly, when a military body, as a regiment, is young or newly organized, it is liable to attacks from these diseases, and their epidemic visitation is proportioned to the totality of the susceptibilities of the men composing the command. Moreover, when it has satisfactorily recovered its health, it remains exempt from all physical ills, except such as result from the wear and tear of life under unhygienic influences.

A susceptible regiment was prostrated by the measles early in its history, very frequently in its camp of organization or rendezvous. When it became a part of the army, by being brigaded with other regiments, its typhoid epidemic broke out, extensive in proportion to its susceptibility, and severe in proportion to its insanitary conditions. When it was pushed forward against the lines of the enemy, in the swamps of Virginia, the lowlands of North Carolina or the bayous of the Mississippi Valley, it again became broken in health—this time by malarial fevers, dysenteries, pneumonias,

the result of unhygienic exposures; but in no part of its history did it have to pass the ordeal of unmistakable typhus infection, although, if a native regiment, its susceptibility to typhus must have been greater than for either measles or typhoid. When typhus cases were reported by a regimental medical officer, it was the individual soldier, not the regiment, that suffered from the disease. In certain instances so many cases were reported from the same command as to raise the greatest anxiety concerning the possible extension of the disease; but in none of these was there that virulence of infection which, during the Crimean outbreak, spared none that had not suffered before, and carried the fever from the trenches of Sebastopol into the interior of France.

My official duty in the preparation of the "Medical History of the War," has made me familiar with most of the febrile outbreaks which were regarded as typhus, and, as their study throws a clear light on the development of the disease, I have been led to make a brief presentation of the results.

Two thousand five hundred cases of typhus were reported during the five and one-sixth years covered by the statistics of the war. These occurred in an average strength of nearly half a million of white troops. They were scattered over the whole of the period and the whole of the country. Now, if these were all cases of true typhus, the number of typhus foci must have been very great, and the escape of the army, as a whole, correspondingly wonderful, in view of the history of other armies in this respect. If they were not typhus fever, it will readily be acknowledged that they must have been specimens of one or the other of the febrile diseases which I have mentioned as having affected our troops; and it is notable that, when fulminant in character, or under unhygienic influences which increased their malignancy, all these diseases tended to typhous features, although, under ordinary conditions, their true nature was readily appreciated.

A few of these two thousand five hundred typhus cases were associated with measles, particularly in regiments which suffered from their typhoid epidemic during the course of its eruptive fever. When these regiments had been crowded in transports for a series of days, or in unventilated buildings, the latter disease assumed typhous characteristics, the patients becoming listless and stupid and the eruption dusky, or failing to appear distinctly. The virulence of the morbific agency seemed intensified by concentration and the *vis conservatrix naturæ* enfeebled by ochletic influences. The medical officers, who were overworked—overwhelmed with new and grave responsibilities, and alarmed by the co-existence of measles and typhoid—were ready to accept these suddenly fatal cases as the onset of a more deadly disease than either of the others, and so recorded them as typhus.

But the majority of the two thousand five hundred cases occurred in association with regimental epidemics of continued or typhoid fever. This is well seen by the correspondence of their statistics:—

| PERIOD. | PER THOUSAND MEN. | | Per cent. of Typhus. |
|---|---|---|---|
| | Reported cases of Typhus. | Continued Fever. | |
| 1861-2 | 2.94 | 123.69 | 2.38 |
| 1862-3 | 1.55 | 91.91 | 1.69 |
| 1863-4 | .56 | 35.81 | 1.56 |
| 1864-5 | .57 | 40.44 | 1.41 |
| 1865-6 | .32 | 29.91 | 1.07 |

In the first year of the war there were 123.69 cases of continued fever in every thousand men, and of these cases, 2.94 were reported as typhus. The succeeding years were characterized by a rapid fall in the rates, except in the case of the fourth, when a slight augmentation was observed, corresponding with the in-flow of recruits to replace men who declined to reënlist at the expiration of their three years of service. It will be observed, however, that the cases of reported typhus became relatively less frequent as the years progressed. In the first year 2.38 per cent. of the continued fevers were regarded as typhus—in the last only 1.07 per cent. This may be accounted for in two ways: In the first place, our medical officers gathered an increasing knowledge of those conditions which caused so many of these typhus, or typhus-like cases in the early period of the war, and, by zealously striving to preserve their men from the influence of these conditions, the number of cases was materially lessened. Secondly, a larger experience of the irregularities, complications and modifications of the typhoid fever manifestations, showed our medical officers that many of the cases which they at first had regarded as typhus were, in reality, typhoid, virulent in character from an excess of susceptibility on the part of the individual attacked, or from the deterioration of his constitution by certain morbific influences. My personal experience can demonstrate, substantially, the legitimacy of the latter suggestion: In 1864, eight regiments, widely separated from each other, in the Army of the Potomac, reported (each) from two to seven cases of typhus. As several of these regiments belonged to the Second Army Corps, my duty as Medical Inspector of that command led me to make inquiries concerning them, when I found that in every case the medical officer who had made the report had already changed his opinion as to the nature of the disease. Typhoid fever was prevailing in his command, and some exceptional cases, which presented no well-defined abdominal symptoms, were characterized by such intense cerebral congestion, duskiness of skin and dark-colored blotches, that, for the time, he was alarmed, and feared that he had typhus fever before him; but as no developments due to contagion had occurred, although the conditions were favorable for them, he was constrained to believe that his so-called typhus was etiologically associated with his local epidemic of well-defined typhoid. And when he spoke of conditions favorable for contagion, he meant, among other things, that his hospital had only twenty blankets, and that these had been so constantly in use, that there had been little opportunity for airing them, and none for washing them, and that, during the previous three months, they had covered no less than three hundred different patients. Yet, notwithstanding all this, there was no indication of typhus contagion, and typhus fever was necessarily excluded. Again, take the experience of Surgeon Zenas E. Bliss. In April, 1862, when his regiment, the 3d Michigan, was in front of Yorktown, he reported a case of typhus, marked by hemorrhage from the nose and bowels and hemorrhagic spots on the surface. At the same time he reported forty cases of typhoid fever. At his hospital—the captured barracks of the 53d Virginia—were aggregated many cases from other regiments than his own, and these were also chiefly typhoid cases of so severe a character that, unfortunately, frequent opportunities were secured of verifying the diagnosis by post-mortem investigation; yet there was only one case of so-called typhus.

Many such instances could be cited, particularly from the camps around Washington in the winter of 1861, when the recently-organized regiments were undergoing their typhoid seasoning; but these will be referred to hereafter.

The reported typhus cases were associated with typho-malarial fever, chiefly through its typhoid element, but, in part, as will now be shown, through its malarial factor.

Malarial fevers, when their paroxysmal recurrence was observable, were never confounded with typhus; but when the first paroxysm proved fatal, with cerebral symptoms and cutaneous blotches, typhus was simulated, though seldom reported. They occurred, chiefly, where intermittents and remittents were prevailing, and were

referred to the prevailing morbific influence. These pernicious fevers assumed various forms, the most common of which was characterized by headache, drowsiness, coma, and occasionally convulsive phenomena and delirium,—sometimes associated with hemorrhages, petechial and hemorrhagic blotches, or jaundice. In some instances, they were regarded as cerebro-spinal meningitis. My friend, Dr. Hand, saw cases of malarial congestion at New Berne, N. C., particularly in the 27th Massachusetts, which were regarded by the medical officers in attendance as cerebro-spinal fever, and this, as we shall see, is coming close to a diagnosis of typhus.

As to pneumonic fever, we have no record of its having been confounded with typhus, although during its epidemic prevalence it frequently assumed characters which led to the suspicion of cerebro-spinal fever. Thus, for instance, in Walker's division of Texas troops, according to the report of Surgeon D. P. Smythe, of the 19th Texas, ten per cent. of the large number of the pneumonic cases were, at first, viewed as cerebro-spinal meningitis, on account of their rapidly-fatal course, and the rigors, headache, delirium and convulsions, with but little pulmonary disturbance, by which they were characterized. In this connection, the experience of Surgeon Ira Russell at Benton Barracks, Missouri, is interesting: Here were six regiments of colored troops, in process of organization, and in four months, from January to April, 1864, there were 784 cases of pneumonia, so called from the post-mortem lesions in 156 fatal cases; there were also 675 cases of measles, of which 130 were fatal, mostly from pulmonary complications, and no less than 42 deaths from cerebro-spinal fever. This is rather a terrible showing for so small a command, and merited a much more searching inquiry into its causes than was given to it. Nevertheless, thanks to Dr. Russell, we do know something about it. The recruits were, mostly, negro refugees, who had endured many hardships in their efforts to reach our lines; they were ignorant and undisciplined, overcrowded in imperfectly-heated quarters, and were not supplied with a sufficiency of clothing to protect them from the inclemencies of the season. The cases of measles and their fatality are readily understood; but the causation of the pneumonia remains open to inquiry. Russell attributed the disease to cold, because a series of mild days manifestly lessened its prevalence, while a series of cold days as notably increased it, and the disease disappeared entirely at the advent of warm weather in May; but he recognized that the attacks were influenced by certain predisposing conditions, among which he enumerated malaria, overcrowding, measles and an epidemic influence. He conceived this last to be manifested by the illness of physicians and nurses who had not been much exposed to the vicissitudes of the weather, and he says that some intelligent surgeons formed the opinion that the disease was actually contagious; for, in the barracks, men occupying bunks near those affected were more liable to be attacked than those more remote. Now, although none of these cases were reported as typhus, the influence of overcrowding, in increasing the number and malignancy of the cases, was very noticeable, and in the aggravation of the disease in cold, inclement weather, when ventilation was inhibited on account of deficient clothing and artificial warmth, we are at liberty to suppose that the concentration of a typhous miasm was felt, rather than that of a meteorological change; and we look the more readily in this direction for the causation, on account of the mildly-expressed suggestion of a contagious quality, and the relative frequency of the cerebro-spinal cases.

Cerebro-spinal meningitis, or spotted fever, was often regarded as typhus; nor is this surprising, when we consider how slowly progress is made in medical science, and that it is only within the present century that this disease has been separated from *typhus siderans*, as a distinct morbid condition; and, further, that there are yet many competent medical minds, particularly in those regions where typhus prevails, who doubt the propriety of the segregation. Where typhus is prevailing epidemically, certain individuals are suddenly seized with chill, headache, prostration, restlessness, jactita-

tion, petechial and purpuric blotches, delirium and opisthotonic spasms, which, more or less rapidly end in somnolence, coma and death; and after death the subarachnoid spaces and ventricles are found charged with turbid or blood-tinged serum, and the base of the brain, particularly in the inter-peduncular space, coated with an opaque and viscid, or a semifluid, pus-like exudation, which may extend along the sulci, over the convexities of the hemispheres and downward under the visceral arachnoid of the cord. These cases are credited to cerebro-spinal meningitis, on anatomical grounds; by others they are attributed to the incidence on the nervous masses of the prevailing typhus cause. Even where typhus does not prevail, these cases sometimes present such a sequence of symptoms that typhus fever is suggested. Thus, Surgeon J. B. Upham, who first published the account of the epidemic of cerebro-spinal meningitis among our troops at New Berne, North Carolina, regarded the disease as partaking of the nature of typhus, in a severe and malignant form, and having a special tendency to the membranes of the brain and spinal cord; as in other typhus epidemics, the weight of the morbid influence falls at one time on the brain, and at another on the lungs or other important thoracic viscera. But during our war, these cases occurred when there was no suggestion of a typhus epidemic, although typhous influences may have been at work in their production. It is a noteworthy fact, however, that cerebro-spinal meningitis never occurred unless some one of the other febrile diseases were prevailing at the same time. Thus, of the chief sufferers in that New Berne epidemic, the 51st Massachusetts was, at the time, under treatment for measles, and the 45th undergoing its typhoid attack; and it is to be observed that certain neighboring regiments of seasoned soldiers, *i. e.*, of those who had already undergone these epidemics, were not visited by the cerebro-spinal fever, although the men of these regiments—the 17th and 24th Mass., the 85th N. Y., and 103d Pa.—were under the same conditions, so far as relates to miasmatic locality, food, clothing and quarters, as those of the affected commands. Measles was present in some of the regiments and typhoid in others, according to the report of Surgeon C. M. Clark, 39th Illinois, who reported the cerebro-spinal cases of the 24th Army Corps. Measles prevailed, also, among the recruits at Galloupe's Island, Boston Harbor, where nineteen cases of cerebro-spinal fever occurred in the experience of Dr. C. G. Page, and at Chillicothe, Missouri, where Surgeon E. Y. Yager saw four cases in the 3d Missouri Calvary. Typhoid fever was the prevailing disease among the recruits at Brattleboro, Vermont, where eight cases—seven fatal—of cerebro-spinal fever were reported; and in the only case which was protracted, the characteristic typhoid lesions of the agminated glands were observed at the post-mortem inquiry. The contagion of typhus fever was present in the National and Hicks hospitals, of Baltimore, Maryland, when Asst. Surgeon G. M. McGill, U. S. A., reported a few cases of cerebro-spinal meningitis; and it is notable, also, that many of the isolated cerebro-spinal cases came to hospital from the guard houses and local prisons, where typhous influences were prominent. Dr. Yager observed its frequency among political offenders confined in the guard house at Chillicothe. His statement is, that about five deaths occurred monthly from cerebro-spinal fever, among a number of men never greater than twelve or fifteen. Moreover, in a local or regimental epidemic, in which the 11th Me. and 104th Pa. lost about six or eight men, these commands were on the coast of South Carolina, and suffering from the malarial fevers of that region; but it must be observed that the first case occurred after they had been crowded on transports for twenty days. The investigating board ascribed the deaths to malaria, ochlesis and deficiency of food.

Now, every one will acknowledge that congestion of internal organs and (if death do not immediately occur) inflammatory exudations, may be occasioned by many morbific agencies. Congestion of the spleen is found in all febrile diseases. Tumefaction of the Peyerian patches, with subsequent necrobiotic changes, is always present in

typhoid, with the incidental implication of any of the other organs. The lungs suffer specially in pnuemonic fever, but they are prone to solidification, by exudation from the congested vessels, in any of the other specific febrile ailments. In typhus, and the paroxysmal fevers, and in the eruptive fevers, particularly on the suppression of the cutaneous manifestations, hyperæmic changes in the internal organs are in order. But the consequences of such changes vary with the organ which is affected. So long as there is mere engorgement with a transudation of serum, recovery may be readily effected, irrespective of the organ involved—but the hyperæmic processes are continuous one with the other, and their line of demarcation can be discovered only by the microscope. Yet the passage of this line is of vital importance to the patient, as its consequence is the establishment of a pneumonia, a pericarditis, a nephritis, a dysentery or a cerebro-spinal meningitis, according to the locality of the hyperæmic tissues. Anatomically, the difference between congestion and inflammation is slight, but clinically and therapeutically, it is great indeed. Malarial coma may be recovered from in a few hours under the influence of quinine, but if exudation has taken place in the meshes of the pia mater, the most liberal exhibition of the remedy will fail to remove the symptoms, which, moreover, are of so striking a character as to suggest to the clinician a disease wholly different in its aspect from malarial fever—a disease *sui generis*—a cerebro-spinal meningitis; yet, from the etiological point of view, we may see them to be the same. And so with regard to the etiological relations of cerebro-spinal fever and the other fevers mentioned—typhus included. Cases of cerebro-spinal fever may, therefore, be regarded as an expression of the malignancy given to febrile diseases by those insanitary conditions which, until the germ theory fructified so suddenly in the medical mind, were believed to be the causative influences of typhus fever.

Having thus determined the relationship between the reported cases of typhus and the diseases with which they might be confounded, we are in position to investigate the specially reported instances of its appearance. Most of these occurred in new regiments, undisciplined and ignorant of the measures necessary to prevent the onset of camp diseases. Neither their officers nor men realized that on themselves depended, in great measure, their freedom from disease; even medical officers, in many instances, failed, apparently, to appreciate the insanitary conditions of camp life. The camp-ground was frequently damp and generally foul, the sinks offensive, and the inter-spaces between neighboring regiments converted into a dumping ground for all their garbage and refuse. The water supply was polluted by drainage or percolation from this foul surface; the cooking arrangements miserably imperfect, and the culinary knowledge of the company cooks defective, even in its elements. The tents or huts were too closely aggregated, and each was overcrowded with occupants. Moreover, a want of warm clothing, as of overcoats and blankets, led the men, as cold weather approached, to devote their energies to excluding the cold, that is, to prevent the ingress of fresh air. Generally, they dug up the ground for a flooring, and banked up the excavated earth on the outside, to close up apertures. The air of each hut, when warmed, as at night, by the exhalations of its sleeping inmates, became oppressively foul; and when measles, remittent or sub-continued malarial fever, typhoid fever, pneumonia, or other febrile disease occurred, among men so situated, the cases were endued with a malignancy which often suggested the existence of typhus fever. The morbific influence was first felt by those whose blood was already deteriorated by the influence of some specific febrile disease; but, even when there was no well-defined disease present, men who remained in these huts for a few days, on account of some apparently trivial ailment, became listless and stupid, and by the time the medical officer was called, his patient was probably delirious or semi-comatose. Many such cases occurred in the camps around Washington; for instance, among the New York regiments encamped

on Meridian Hill, as reported by Surgeon J. H. Warren. The particulars of four or five cases, in the 123d and 149th New York, were recorded by Assistant Surgeon Warren Webster. All the insanitary conditions were present in these camps, including the typhoid infection. As an illustration of the overcrowding, he stated that one of the patients had slept for two weeks prior to his attack, along with four other soldiers, in a partially-excavated hut, having an area of only five by seven feet. A malignant fever which caused a few deaths in the 11th Pennsylvania, and occasioned some fears for the safety of the regiment, was probably of a typhous nature, for the conditions were essentially similar to those already indicated, although the quarters occupied were the buildings of St. John's College, Annapolis, Maryland, and not the army hut, as at first constructed in the field, or the unventilated wooden barrack, with its closely-set three-tiered bedsteads, as found at the recruiting depôts. When men were closely crowded, whether in huts, pavilion barracks, or extemporized quarters, the effects were the same. Witness, for instance, the case of a company of the 121st colored troops, as recorded by Surgeon J. B. Jackson. The men were quartered in a large building, well lighted, but with a low ceiling, and only one stove. The intensely cold weather made it necessary to partition off a room, twenty-five by thirty feet, where, for about ten days, fifty or sixty men were crowded together, day and night. While thus quartered, three recruits were brought to the hospital, in a state of collapse, with cold extremities, slow and weak pulse, a vacant stare, mental hallucinations and subsultus. One died, on the second day after entering the hospital, one on the fourth, and the other, a few days afterward. Meanwhile, all cases of measles, fever or diarrhœa from this command assumed a malignant character. The commanding officer was informed of the conditions, and immediately had his quarters expanded, and encouraged his men to pass the time in the open air; and in two weeks the diseases of the company became more amenable to treatment. Surgeon Franklin Irish, of the 77th Pennsylvania, reported that when, at Mumfordsville, Ky., his regiment was confined to its tents for ten days, on account of inclement weather, a few cases of a malignant petechial fever, which he believed to be genuine typhus, appeared among the men. Similar developments, on a somewhat larger scale, were observed among several of General Butler's regiments at New Orleans, La., as recorded by Surgeon E. F. Sanger. These regiments had been crowded to excess, on transports, for thirty or forty days, *en route* from New York to Ship Island, Mississippi, and again, for about sixteen days, in their passage up the river to New Orleans. The 14th Maine was said to have been a heavy sufferer. Its report for the quarter ending June 30th, 1862, signed by surgeon Enoch Adams, shows sixty typhus cases; five were fatal in the regimental camp, and eight of those sent to the St. James Hospital.

Now, from these and other such instances, it is evident that overcrowding and the unhygienic conditions that were usually associated with it, gave a virulence to all febrile diseases and changed their features by covering them with a typhous mask. In pneumonia we may have typhoid symptoms without the presence of typhoid fever. May we have typhous symptoms, as in the instance under consideration, without the presence of typhus fever? In other words, were these cases typhus, or merely the result of a constitutional depravation? They were so like typhus that, had they been contagious, no one would have questioned their identity. This brings us to the history of an outbreak at Camp Noble, near New Albany, Indiana. The disease appeared in January, 1864, among seven companies of undisciplined recruits, aggregating about five hundred men, overcrowded in a filthy camp. Branch No. 6, of the New Albany hospital, received about fifteen or twenty cases, but these were not all, for cases were sent as well to the other branches of the hospital. Medical Inspector Lewis Humphreys reported them, on admission, as presenting headache, delirium and great depression of the nervous centres, with obstinate vomiting, constipation and a tendency to collapse; the pulse over 100 and compressible, the surface cold, the extremities covered with

petechiæ—reddish at first, subsequently becoming dark—the attack sudden and generally terminating fatally in a few days. Recruits furloughed from this camp became affected with the fever after their arrival at their homes; and other members of their respective families also suffered, taking the disease apparently by contagion.

This testimony is important; although it may be undermined by the suggestion that this was true typhus, imported from some focus of infection, while the other instances that have been cited were merely illustrations of the malignancy arising from insanitary conditions. Yet most probably all of the men belonged to the State, and there is no record of typhus in Indiana at that time. From this epidemic alone it might be argued that typhus fever is developed irrespective of a preëxisting case; but, fortunately, the medical history of the war furnishes stronger testimony than this that contagious typhus may be developed *de novo* in the camps, hospitals and prisons of military life, and wherever in civil life similar unhygienic influences prevail. The germ theory of disease has done much for preventive medicine; but hasty generalizations are harmful, and in the case of typhus fever it may be well for preventive medicine if we drop back to the belief of our forefathers, that typhus is generated from a miasm, or unknown something, which is itself generated under well-known and avoidable conditions.

To establish this point, there is needful an epidemic of assured typhus free from the suspicion of its causation by an antecedent case. Such an epidemic occurred at Wilmington, N. C., toward the close of the war. On the 25th and 26th of February, 1865, 8600 Union soldiers, paroled or exchanged prisoners, arrived at that city on the breaking up of the Rebel prisons at Salisbury and Florence. Of this number 3400 were too sick to bear transportation northward, and were distributed among the various hospitals. During the first week of March typhus fever appeared in these hospitals, affected the regiments garrisoning the town, the citizens, and even the inhabitants of the surrounding country, to whom it was carried by people who fled from the infection. Dr. Hand, of St. Paul, Minn., then Medical Director of the Department of North Carolina, has given a full report of the epidemic. 1200 white and 300 colored soldiers died of the disease during its prevalence.

How did this disease originate? It did not exist in Wilmington prior to the arrival of the prisoners. The prisoners, therefore, must have brought it with them; and this is proved by the fact that nearly all of the officers and men of the steamers on which they were brought to Wilmington were struck down by the fever. The prison from which they came consisted of a brick factory and five buildings which had been formerly used as boarding houses for the operatives. Eleven acres of ground around these buildings were fenced in as the prison pen, where 10,000 prisoners sought shelter in "dug-outs," having but one Sibley tent to each hundred men.

But, if typhus was developed at Salisbury, why did it not show itself at Andersonville, where, on twenty-one acres of available ground, there were 33,000 prisoners similarly circumstanced as to lack of clothing, food and shelter, and exposure to meteorological changes and offensive effluvia? Because at Andersonville the hospitals consisted of half-finished barrack sheds, roofed and floored, but open at the sides—practically the patients were in the open air—while at Salisbury the hospitals were brick buildings—the four-story factory and the boarding houses of its operatives. What the amount of crowding may have been if expressed in air space per patient, is unknown, and, probably, if known, would be of little value, as the foulness of the air in a room occupied by a number of inmates depends more on deficient ventilation than on so many feet of air-space more or less per man. In accordance with what is known of the management of these prison hospitals, we may suppose that the floor space of the rooms occupied by the sick was well crowded. The point to be considered is, that during the cold winter weather of the occupation of the prison, the shivering patients,

without blankets, without even straw, and with a deficient supply of fuel, would be more likely to stifle in the vitiated atmosphere that had been warmed by their own bodies, than to throw open the windows and effect such a ventilation of the room as was possible. Here were precisely the conditions under which, in the language of modern medicine, the germ of typhus, if introduced, would be propagated with the utmost activity. They were precisely the conditions that in earlier times were regarded as giving rise to the disease.

There is no record of typhus fever at Salisbury, but there is a record of the burial of 3479 prisoners out of 10,321, in less than four months, and it must be conceded that this record does not exclude the possible existence of typhus. In fact, that typhus fever did exist, we are constrained to believe, on account of the subsequent developments. The fever might have caused frequent deaths among the inmates of an infected ward without attracting special notice, so great was the indifference of the Confederate authorities at these prison pens to loss of life among the prisoners, and without spreading to the occupants of the enclosure, protected as they were from contagion by their open-air life; but when the prisoners were packed on the trains and transport steamers, which were to convey them to Wilmington, every facility was afforded for the spread of the disease and its appearance among them as a general epidemic on their arrival. Their subsequent distribution among the hospitals and barracks of Wilmington sufficiently accounts for the extension of the disease to the citizens and local garrison.

In view of the history of this outbreak, we must conclude that typhus was present at Salisbury prison. But how did it get there? Was the germ introduced, or was it developed from some ordinarily innocuous microphyte, by successive cultivations under conditions favorable for the assumption of virulency. The prisoners had been confined at that prison for nearly five months. Their prison-ground was surrounded by a high stockade, which cut them off from even a sight of the outer world. If the disease did not originate there, whence did it come? There was no typhus in the town of Salisbury, none in its neighborhood—none even, so far as we know, within the limits of the Confederacy. Indeed, if typhus was present at this time in the United States of America, the cases were exceptional, and confined to the hospitals of the Northern cities, hundreds of miles from these prisoners, and separated from them by the lines of conflicting armies. From these facts we must deduce the *de novo* origination of the disease—born, as in Ireland, amid the squalor, misery and famine of overcrowded dwellings.

In looking back upon the cases reported from our regimental camps, and considering them in the light thrown upon them by this Salisbury epidemic, we may observe the gradual evolution of the disease. We may see its efforts to spring into being in the small tents or huts of the troops in the field, affecting chiefly those in whom the *vis conservatrix* was weakened by the influence of some existing febrile affection. We may see more potent manifestations, when inclement weather or a sea voyage confined the men for a lengthened period, a typhus affection, *per se*, being then introduced, and not the mere modification of existing disease by harmful surroundings. Similarly, we may see more decided results when, as in the 121st colored infantry, and at New Albany, Indiana, the men were crowded by companies instead of by small squads of four or five. Lastly, as at Salisbury, where the numbers in each dwelling were large and the confinement prolonged, we may see the fully-developed fever spreading from man to man, as it did in the days when ignorance of sanitary laws permitted armies to be destroyed by the pestilential typhus infection.

[It is regretted that want of time prevented the reading in full, and discussion of the points in this valuable paper.—PRESIDENT OF SECTION.]

TRANSLATIONS OF DR. BONTECOU'S LABELS, FOR FOREIGN SERVICE. (SEE P. 135.)

## BOÎTE DE BONTECOU

### POUR LE PANSEMENT DE CAMPAGNE DES BLESSURES DE SOLDAT.

Cette boîte contient quatre topiques antiseptiques. Chacun d'eux consiste d'un petit coussin de *lint* antiseptique (bi-chlorure), et est doublé d'une couche de poudre d'acide salicylique et d'iodoforme inodore. Ce petit coussin est placé au milieu d'un morceau de taffetas à propriétes très collantes, de sorte qu'il s'applique à la peau sans l'aide de bandages. Tout ce taffetas, est recouvert d'une toile claire antiseptique, et enveloppé de papier paraffiné, et placé dans une boîte a ferblanc à forme de tabatière et d'un poids de moins de 84 grammes.

MODE D'EMPLOI: Dépliez le taffetas, enlevez la toile, et faites-en un tampon si le cas le requiert, puis appliquez le topique sur la blessure. Dans le cas d'une grande blessure prenez deux carrés de taffetas, et même davantage s'il le faut, soudez-les ensemble par la simple juxtaposition de leurs côtés, et remplissez les espaces dépouvus de *lint* avec la toile qui recouvrait le taffetas, puis appliquez le topique. Le taffetas s'attachera de lui même à la peau sans bandages. Si le taffetas est trop grand déchirez-en une partie.

Invente par R. B. Bontecou, M. D., chirurgien, colonel de U. S. Vol., Troy, N.Y., Etats-unis d'amerique.

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## PAQUETE DEL SOLDADO, DEL DR. BONTECOU,

### PARA LA CURA DE UNA HERIDA.

Contiene parches adhesivos, y cada uno tiene una almohaldilla de lino antiséptica, incluyendo polvos antisépticos, cubierto todo con una gasa antiéptica, y encerrado con papel parafinado en una caja de hoja de lata. Presentado en el 9o Congreso Internacional de Medicina por R. B. Bontecou, Doctor en Medicina y Cirujia, y Coronel graduado de U. S. V., Troy, N. Y., E. U. de A.

DIRECCIONES PARA USARLA: Límpiese y séquese el pellejo cerca de la herida, desdóblese el parche quítese la gasa, y úsese como tapón para la herida, si es necesario, aplicando el parche de manera que la almohadilla antiséptica cubra la herida. Si la herida es grande, los parches pueden unirse, llenando los espacio entre las almohadillas con los pedazos de gasa bien doblados. Se adhiere sin bendage, y puede reducirse en tamaño, si es necesario, rasgándolo, usando los pedazos para las heridas en los dedos. Con este objeto, la caja contiene tambien algunos de estos pedazos.

Preparado por H. Gnadendorff, Farmacéutico, Calle 2a, No. 14, Troy, N. Y., E. U, de A.

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## BONTECOU'S MILITARISCHER NOTHVERBAND.

Das Packet enthält einige Heft-Verbände. Jeder derselben hat oben ein Kissen von antiseptischer Charpie und darunter ein antiseptisches Pulver. Das Ganze ist mit antiseptischer Gaze bedeckt, dann in Paraffin-Papier gehüllt, in eine Blechdose mit Klappdeckel gepackt, und wiegt weniger als 3 Unzen.

GEBRAUCHS-ANWEISUNG: Man reinige und trockne die Haut im Umfang der Wunde, falte das Pflaster auseinander, nehme die Gaze ab und benütze diese, wenn nöthig, als Bäuschchen für die Wunde; dann lege man das Pflaster auf die Letztere, und zwar so, dass sie von dem antiseptischen Kissen bedeckt ist. Bei grossen Wunden können die Pflaster so an einander gefügt werden, dass sich deren Ränder decken. In diesem Falle falze man die Gaze-Streifen so, dass damit der Raum zwischen den Kissen ausgefüllt werde. Der Verband hält ohne weitere Bandage und kann, wenn gewünscht, durch Abreissen eines Stückes kleiner gemacht werden, welche Stücke, sowohl wie beiliegende Streifen, als Verband für Finger und Zehe dienen.

Methode des Dr. R. B. Bontecou, Militärarzt mit dem Range eines Obersten der Ver. Staaten Armee, Troy, N. Y., Ver. Staaten, Nord-Amerika.

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# FIRST DAY.

MASONIC TEMPLE, MONDAY AFTERNOON, THREE O'CLOCK.

The Secretary-General, Dr. JOHN B. HAMILTON, introduced the President of the Section, Prof. DE LASKIE MILLER, M.D., of Chicago.

Dr. Hamilton said :—

GENTLEMEN—I have the honor, as well as the pleasant duty, of introducing to you as the President of this Section one whom many of you will recognize as a friend, one whose life has been spent in teaching the branch of Medical Science to which this Section is specially devoted. I have also the pleasure of making acknowledgment of my personal obligations for his wise teachings and the lasting impression his eloquence made upon me as one of his pupils. I now introduce Dr. DE LASKIE MILLER, Professor of Obstetrics in Rush Medical College, Chicago, whom the Committee have chosen to be the President of this Section, and whose selection was ratified this morning by the unanimous vote of the Congress in general session.

Prof. MILLER then delivered the following address :—

GENTLEMEN—My chief duty on this occasion is to extend to you a cordial greeting. No greater pleasure, no more distinguished honor, could be desired, than to be commissioned to give a fraternal welcome to gentlemen representing, as you do, the highest scientific attainments, the most mature and advanced thought and the most effective skill in the department of obstetrics. I am authorized to assure you, gentlemen, that I do but voice the sentiments of the Council of this Section in thus expressing to you our appreciation of the honor conferred by your presence.

Words can but inadequately express the full measure of our appreciation of your zeal in the objects of this meeting, and of your devotion to the important work of aiding in the elevation of obstetrics to the plane of scientific knowledge and of mathematical demonstration. The sacrifices which you have made for these purposes may not be enumerated. As we contemplate the vast congregation of physicians now in this city, whose lives have been and still are devoted to the work of unfolding scientific truth, we are impelled to ask : For whose good? But little reflection will enable us to appreciate the truth of the answer which returns, for the good of humanity. Ours has long been recognized as a philanthropic profession, and were there no other considerations, the meeting of this Congress for earnest consultation on the abstruse elements of science would amply justify this recognition ; for here all achievements and inventions of utility, which may in any way ameliorate the condition of mankind or benefit society, are generously added to the stock of universal treasures. We tolerate no private monopolies. The underlying principle which actuates every physician is an emulation in works of disinterested benevolence.

What then are the compensations? Unlike the conditions which existed in ancient times, when the destruction of a public library, or the sackage of a city, was sufficient to blot out the improvements and acquired knowledge of centuries, you

have this assurance, that all additions to the sum of human knowledge which may be made by your industry shall be preserved from the possibility of lapsing into oblivion. Cities may disappear in lurid vapor, with all their treasures of invention, of science and of art, yet the record of your achievements shall remain; for in our day these immediately become the property of civilization and are utilized throughout the world.

The prominent characteristics of the medical profession at the present time are intensity of application and persistency of purpose. To these traits are due the discovery of new facts, the evolution of new principles and the formulation of new rules of practice, which are recurring with a frequency that is startling.

The successes already achieved are but normal stimuli to renewed energy in the search for the ultimate forces and factors of our existence. There is reason to believe that there was a shading of truth in the assertion of the Philosopher—he was also a physician—who more than two thousand years ago said, "Probably all art and all wisdom have often been already fully explored and again quite forgotten;" then may it not be true that in the distant past men were familiar with facts and principles which are held as important and are accepted as new to-day? Could the silent centuries speak to us, what revelations might they not make? What maxims of practice, what rules of therapeutics, which would do no discredit to the last quarter of the nineteenth century! The accoucheur was busy then as now. Did the gynæcologist then as now follow close after the obstetrician to repair injuries by perinæorrhaphy and trachelorrhaphy? Queries like these must remain enigmas.

Obstetrics appears, as it passes before the mental vision, like a panorama in light and shade. Supposed discoveries in the science and improvements in the art illuminate the scene, till the crucial test of experience casts the shadow of disappointment over the factitious light. We seek truth. Physicians know too well that the search is surrounded by difficulties, for we advance along the asymptote of the hyperbola; though we have not attained to the absolute, we are approaching the object of our quest. Herein are reasons for convocations like the present Congress.

How difficult is the true interpretation of a fact must be apparent to all in this presence. A symptom may be accepted as the expression of a fact in pathology; it appears tangible, yet in practice we come to learn that the forms and colors presented by the kaleidoscope are hardly more varied than the import of a symptom of disease. Hence is our logic liable to prove faulty.

The impunity with which encroachments are now made upon the hitherto supposed inaccessible recesses of the body, has led to a new departure in our art, and gives the promise of placing our practice on the basis of demonstration. No cavity is now too deep, no organ too important or vital, to deter from direct physical interrogation. By vision and tact, the gravity, density and magnitude of any, of every part, may be revealed to the sensorium and adjudicated by the unerring edict of positive knowledge. Though now the benefits of this mode of exploration are mostly prospective, yet in fruition they will be incalculable. Surely it is not expecting too much, when the hope is expressed that those who take part in a future Congress may not be compelled to confess that mooted questions in etiology, in pathology and in practice engage the attention of the profession, which are no nearer a satisfactory solution than they were a century ago. A free discussion of such topics by this Congress will confer a boon upon the members of the profession throughout the world; and not of least importance will this be to those of our guild who are located far from populous centres, and who are endeavoring to conscientiously discharge their duties to the public and with credit to the profession.

It is safe to affirm that there are in these United States more than sixty thousand physicians now engaged in the practice of obstetrics. These earnestly desire and anxiously await definite teachings to guide them through the difficulties which must often beset them. They are wearied by the ever recurring *Post hoc, ergo propter hoc*, and the utterances of these meetings will be accepted by such as the decisions of the court of last appeal.

CRANIOTOMY.

This is not the occasion that would justify an enumeration, much less a discussion of these questions. It is hoped that a brief allusion to two or three will not be considered a violation of good taste. It is not intended in any sense to forestall the opinions which may be advanced or to limit discussion. Feeling deeply interested in the necessity of revising the rules for meeting the indications of practice in contracted pelves, the question of craniotomy upon the living child forces itself on the mind too strongly to be resisted.

Craniotomy was never before thought about as it is now, it was never before talked about as now, or written about as the profession now write; which gives reason to hope that in the near future it will be adopted only in peculiar complications.

Independent of theological views, it is only of recent date that this question would cause debate. The earnest discussions of the subject, and the fact that the number of skilled obstetricians of large experience is yearly increasing, who believe that the operation should be abolished, should lead us to weigh carefully the apparent necessities in any given case before the death-dealing perforator is taken in hand.

That this operation, which is so repugnant to the feelings of humanity, has been performed too frequently, is undoubtedly the consensus of opinion in the profession, and one good result of the agitation will be to cause more hesitation in deciding to operate upon the child, and the probability of selecting some alternative procedure which shall not add to the danger of the mother.

In discussions it is too frequently assumed that craniotomy is almost unattended with danger to the mother, a position not justified by facts. Statistics drawn from the experience in large institutions, which are under the supervision of the most experienced and skillful, are unquestionably reliable, so far as those institutions are concerned, but they are valueless as indicating results in general practice. The inference is that the maternal mortality from this operation exceeds that indicated by the reports from lying-in hospitals.

When we have eliminated the factors not involved, the question is reduced to very simple proportions. Not to be considered, are the cases in which, 1st, the fœtus is dead; 2d, when the available space of the pelvis is two inches or below; and 3d, when the shortest diameter of the pelvis measures three and one-fourth inches. Then, in deformity of pelves between these extremes, craniotomy has been generally accepted as the inevitable operation. The plea now urged is, that with the improved technique of the alternative operations these become elective. Under the new régime the interests of the living child will constitute a more important factor, and justly so, for in the ideal future the child shall be preserved by operations which shall not enhance the danger of the mother. The world will surely become acquainted with the possibilities of this conservative practice, and then the public will demand the highest skill attainable in obstetrics, and this demand must be met.

It may be urged that only a small proportion of the profession will ever attain to this highest skill, while all will engage in obstetric practice. In answer to this it may be assumed that the requisite skill may be found in every community, and such

can be commanded, as it is now in lithotomy, splenectomy, nephrectomy and cognate operations.

### EXTRA-UTERINE PREGNANCY.

To say that the management of ectopic pregnancy involves questions of vital importance is the mere utterance of a truism. Yet, while the profession entertains the diverse views upon the subject which prevail to-day, and teachers advise procedures so opposite and leading to results so unsatisfactory, this Section may well direct attention to the treatment, and may we not hope that in its wisdom rules may be formulated which shall partake less of uncertainty than those reflected from works of highest authority.

The skill to make an early diagnosis is essential; when this has been acquired much of the uncertainty regarding treatment will vanish, for then the peril that would result from rupture of the environment would be anticipated, not by aspirating, nor by the administration of drugs in the vain hope of retarding the growth or of causing the death of the embryo, nor yet by injections of toxic agents into the ovum, for the accoucheur would duly consider the feasibility of utilizing that potent fluid which in so many ways in civilized life has become subservient to the highest interests of society. The electric current may be directed through the ovum with the confident expectation of arresting its vitality without adding to the danger of the mother.

### THE PUERPERAL STATE.

Of first importance to insure success in obstetric practice is the adoption of a régime which shall render the puerperal woman aseptic. No argument is deemed necessary to establish this position. The best means for this purpose may admit of discussion. Undoubtedly, the majority of accoucheurs apply some one or more of the ordinary antiseptic agents in the form of douches to the parturient passage, such as carbolic acid, bichloride of mercury, permanganate of potash, etc. Used with proper care, these solutions are efficient in the removal of the effete discharges which are eliminated during the stage of convalescence after delivery. But have gentlemen never observed any deleterious effects from the use of these agents in the puerperal state? Then the writer's experience has been peculiar.

It should not be forgotten that in a considerable proportion of these cases the function of the kidneys is impaired, and that in this condition of these organs the introduction of a limited amount of carbolic acid or corrosive chloride of mercury may produce toxic symptoms of a grave character.

The channels of introduction will be understood, when it is remembered that a quantity of the solution will be retained in the vagina after the douche has been administered, and from this pool sufficient of the salt may be (will be) absorbed in extreme cases to cause disastrous consequences.

Is this use of the agents named necessary after every normal labor? The answer to this query will be negative if other and innocent means can be applied which are efficient. If, as some believe, cleanliness is the great antiseptic in obstetric practice, why not rely on the use of pure water? Much evidence might be adduced in favor of the use of lenitive lotions; moreover, in the use of non-irritants the danger of substituting for sepsis an equally dangerous toxic condition is avoided. It should not be forgotten that normal parturition and the recovery therefrom are natural processes, and that if we insure asepsis dangerous antiseptics are not required.

In some important particulars ours differs from other professions. The opinions and rulings of the law courts, coming down from gray antiquity, are venerated as

were the vague utterances of the Delphic oracles by the ancient Greek, and to-day are accepted as of binding force. In Divinity it is still held by some that all which is new is not true, and that which is true is not new. In medicine we tolerate innovation, we welcome progress, and we cheerfully award the meed of praise due the eminent men who have done noble work in elevating our profession to the plane from whence it commands the recognition and respect of the learned in all civilized lands. Yet with us the authority of a name has no binding force. We accept as governing principles of action that which science dictates, which is fortified by experience and justified by results. Nevertheless, when we remember Hunter and Smellie and Levret, and recall the value of their work in laying the scientific foundation of obstetrics, we are impressed with something more than admiration for the grand genius of these fathers of our science; we revere their memories; and to Denman and Nægelé and Baudelocque, to Simpson, Spiegelberg and Cazeaux, who contributed so much in raising the superstructure, is due, and we cheerfully ascribe, unstinted praise.

Many who have honored this Congress by their presence hail from the old world, while this, by contrast, is designated the new. The line of worthies in our department of medicine is short when compared with yours of the Orient, still in America we may present the names of obstetricians of past generations who would reflect credit on any age or part of the world. With your permission, a brief mention will be made of a few whom Americans delight to honor.

Samuel Bard, M.D., after securing a liberal education and passing through a course of medical studies at home, visited Europe at a time when there was less of luxury in travel than there is at the present time. He studied medicine in London and at Edinburgh, where he received the degree of Doctor in Medicine, in 1765.

On his return to this country he engaged in the duties of his profession and soon secured a large and lucrative practice. He was the family physician of General George Washington, the first president of the United States. He occupied successively many positions of honor and responsibility. He soon became popular as an accoucheur. He was the first in this country to essay authorship in obstetrics. In 1808 he published a "Compend of the Theory and Practice of Midwifery." This was not a ponderous volume, but was written in a plain, simple style; the teachings were concise and abounded in conservative maxims. That this work was appreciated by the profession is evidenced by the fact that it passed through several editions. The doctor had an unlimited confidence in the resources of nature, and hence he disparaged interference with the processes of parturition, and especially discouraged the use of instruments.

Wm. P. Dewees, M.D., for many years Professor of Obstetrics in the University of Pennsylvania, was one of the most industrious, persevering and conscientious physicians of his time. He was an original thinker and possessed the courage of his convictions. If he drew inspiration from any scientific printed page, it will be conceded that Baudelocque was his ideal, but from the school of nature he derived his most valuable knowledge. Being endowed with quick perception and sound judgment, he could educe important principles from the daily experiences of active life that others would fail to appreciate.

He wrote a work on midwifery which for many years was accepted as a standard authority in this country; it was well known and highly appreciated in Europe. He published a practical work on the diseases of women, and one on children, and also a Compendium of the Practice of Medicine.

Undoubtedly Prof. Dewees exerted a greater influence in elevating the profession

by diffusing his well-considered and systematized knowledge than any individual writer of this country.

Charles D. Meigs, M.D., Professsor of Obstetrics in Jefferson Medical College, was ever the popular lecturer, on account of the fluency of his language, his florid style, and his remarkable ability to indelibly impress the auditor with the importance and truth of his utterances. The members of his classes seldom found it necessary to take notes of his lectures; they could recall at will the important facts of his teaching.

Prof. Meigs was a facile and prolific writer, having published a work on Obstetrics, one on Woman and her Diseases, and others on special subjects of importance to the profession.

James P. White, M.D., was one of the original founders of the medical department of the University of Buffalo, and to the time of his death he was the Professor of Obstetrics in that institution. On entering the profession he rapidly acquired a large practice, which taxed his physical energies to the utmost. It remains a question whether this success in thus acquiring a practice is an unmixed blessing. Certainly in one sense the profession suffered loss, for it made such demands upon his time, as it has on that of others similarly situated, that but limited opportunities were permitted for literary labors, though Doctor White contributed many valuable papers to the medical journals of his time.

Prof. White was among the first to achieve great success in reducing chronic inversion of the uterus, for which he obtained considerable celebrity. His attempt to utilize the cases in the hospital in his obstetric clinic was not altogether successful. The public had not been educated to appreciate the great advantages of practical teachings, and this ever-modest public disapproved and arrayed itself in opposition to Prof. White's mode.

Prof. White introduced before his class a woman in actual labor. During the progress of the case he described the phenomena of parturition, and illustrated the various means of diagnosis by the touch, by external palpation and by auscultation, until delivery took place, for which the Professor was not only remonstrated with, but he was cited to answer in a court of law for outraging public decency.

The faculty of the college gave the Professor every possible support, still the feeling of opposition to his course was so strong that these demonstrations were discontinued.

Prof. White will be remembered as a skillful physician, as a public-spirited citizen, as a man of unsullied character and as a gentleman of affable deportment and highly esteemed in every relation of life.

Henry Miller, M.D., was for many years Professor of Obstetrics in the University of Louisville. He was a popular teacher and commanded the respect and confidence of the students by his urbanity and the personal interest which he manifested in his intercourse with the class.

Prof. Miller was the author of an excellent text book on the "Principles and Practice of Obstetrics," which was published in 1858, which evinced perfect familiarity with the science of obstetrics at that time. This work was extensively read by the profession and exerted a decidedly conservative influence.

Prof. Miller's experience in treating the diseases of women was large, and he was among the first to treat the endometrium by the direct application of escharotic solutions to the cavity of the uterus.

M. B. Wright, M.D., Professor of Obstetrics in the Medical College of Ohio, was a recognized teacher of the highest order, an industrious and thoughtful practitioner

in his favorite department. He enriched the resources of our art by first practicing and minutely describing his method of performing cephalic version by bi-manual manipulation, which was an improvement on Flamand's method and was peculiar to himself. Professor Wright first practiced his method successfully in 1850, and received a gold medal from the Ohio State Medical Society in 1854, as an award for the value of his improvement in the management of difficult labors.

To Hugh L. Hodge, M.D., Professor of Obstetrics in the University of Pennsylvania, must be conceded the credit of producing the most elaborate work on obstetrics that has been written by an American obstetrician. This exhaustive work is founded on the personal experience of the author, and is characterized by correct observations and logical deductions. The opportunities enjoyed by Prof. Hodge for personal experience were unlimited and were used in a philosophical manner. In his work much space is properly devoted to the elaboration of the facts and principles underlying the mechanism of natural labor; for how shall the accoucheur who is in any respect deficient in an accurate knowledge of these, be enabled to detect, as he should do, the slightest deviation from the normal process. The difference in results of practice between the scientific and the routine practitioner may generally be referred to the relative knowledge of these elementary principles possessed respectively by each.

Prof. Hodge published also an important work on the Diseases of Women, which abounds in important original knowledge, and would not fail to interest, and might be studied with profit by, the gynæcologist of the present time.

Feeling an innate horror of the crime of abortion, alas, too common in our day, Prof. Hodge never failed to admonish his class of the immorality of the act; and he published a brochure on Fœticide, which he characterized as a crime against nature, humanity, morality and the civil law, and which justly consigned the abortionist to the scorn of all right-thinking minds and the deep disgrace of the murderer.*

But what shall be said more? Time would fail to do even partial justice to the memory, the worth and the works of James and Shippen, of Francis and De La Mater, of Bedford and Channing, of Gilman and Elliot, and to others whose virtues and labors have shed a lustre on the medical profession.

Gentlemen, these remarks must be terminated. The amount of scientific work before the Section admonishes that the time so valuable to all must be utilized in the study of the important subjects to be presented, and I well know how anxiously, even impatiently, the Section is waiting to listen to those who come prepared to instruct.

Your indulgence is craved for a brief moment longer. The writer would do violence to his feelings should he close without referring to the loss which he, as well as you, must feel in the demise of Alfred Meadows, M.D., the outspoken advocate of the rights of the child in parturition, whose heart was in his work when endeavoring to convince his brethren of the possibility of banishing from obstetric practice the revolting operation of craniotomy on the living child.

In the decease of Dr. Meadows not only Great Britain but the entire medical profession has suffered an irreparable loss.

Every annual revolution of the earth has been rendered memorable by the

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* In collating the foregoing brief biographical notes the writer acknowledges indebtedness to "A Century of American Medicine," by Professor T. Gaillard Thomas. *American Journal of Medical Sciences, July,* 1876.

departure of brightest intellects from our profession, and the year A. D. 1887 is no exception. The sun had made but few diurnal revolutions, and the passing year was still young, when the recorded page of the world's progress opened before us with the broad sombre margins .

IN MEMORIAM

of the decease of Professor Carl Schroeder, respected by all—beloved by those who enjoyed the high privilege of his personal acquaintance.

Our loss seems the greater because his death was so sudden—so unexpected. To enumerate his professional works would be an offence to the intelligence of this audience: they challenge the emulation of the ablest in our ranks. Though stricken down when his sun was approaching its meridian, he had already accomplished so much, that his good works will impress the profession for many years to come. And his memory will be cherished not only by his *confreres* of the University with which he was connected, but by our guild in all lands.

The suggestion to erect a suitable memorial to his worth, which has met with such prompt responses, is a fitting tribute for his influence upon this age.

The writer well remembers the inaugural address before the Section on Obstetric Medicine and Surgery, at the seventh International Congress, by the President of the Section, the venerable Dr. Alfred H. McClintock, LL.D., and all who heard Dr. McClintock on that occasion, if they had possessed no other knowledge of the man or of his character, must have been impressed with his kindly disposition and genuine goodness of heart. In closing his address, as he did, in the beautiful lines of one of England's favorite poets, the sentiment seemed then as prophetic—a prophecy too soon to be fulfilled in the case of the good McClintock:—

"My thoughts are with the dead; with them
I live in long-past years,
Their virtues love, their faults condemn,
Partake their hopes and fears,
And from their lessons seek and find
Instruction with an humble mind."

Dr. CHARLES WARRINGTON EARLE, in the absence of the author, read the following paper :—

# ON THE CONTRACTIONS OF THE UTERUS THROUGHOUT PREGNANCY, AND THEIR VALUE IN THE DIAGNOSIS OF PREGNANCY, BOTH NORMAL AND COMPLICATED.

## SUR LES CONTRACTIONS DE L'UTÉRUS PENDANT LA GROSSESSE, ET LEUR VALEUR DANS LE DIAGNOSTIQUE DE LA GROSSESSE NORMALE ET COMPLIQUÉE.

## ÜBER DIE CONTRACTIONEN DES UTERUS IM GANZEN VERLAUF DER SCHWANGERSCHAFT, UND IHR WERTH FÜR DIE DIAGNOSE SOWOHL DER NORMALEN, ALS AUCH DER COMPLICIRTEN SCHWANGERSCHAFT.

BY J. BRAXTON HICKS, M. D., LONDON, F. R. S.

Consulting Obstetrical Physician to Guy's Hospital, Obstetrical Physician and Lecturer on Obstetrics at St. Mary's Hospital, London, etc.*

Fifteen years have elapsed since I first directed the attention of the profession to the fact that, during the whole of pregnancy to its termination, the uterus contracted and relaxed at intervals usually varying from five to twenty minutes. Since that communication to the Obstetrical Society in 1871, my attention has constantly been directed to this fact, and I have endeavored to illustrate the physiological effects of these contractions in the proceedings of the Royal Society, No. 195, S. 79, in a "Note on the Auxiliary Forces Concerned in the Circulation of the Pregnant Uterus in Woman." I have there shown tracings of the alterations these contractions make on the respiratory wave of the abdomen. Besides the study of their physiological uses, I have, since my first paper, added much to my previous knowledge, and have found the information of very great value in the diagnosis of normal, extra-uterine and complicated pregnancy. Additional cases, with remarks, have been brought before the meetings of the International Medical Congress in London and Copenhagen, and published in their *Transactions.* Since these meetings other cases have frequently occurred to me, showing the value this knowledge gives us, and it may be interesting to the members of the Washington meeting if I briefly point out the practical application of the knowledge obtained by recognizing these intermittent contractions. Before doing so, it may be well to observe that when the uterus is below the fourth month, it is much to be preferred to employ both external and internal palpation ; after this time it is not so necessary. If it be undesirable, as when we merely suspect pregnancy in girls and single women, to employ internal examination, it will be needful and not at all difficult to make out the outline of the uterus by the hand laid over the lower abdomen, if the patient be made to breathe deeply and fully ; as the walls of the abdomen rise and fall with the respiration, the resistance caused by the presence of the uterus is readily perceived. And, although sometimes the variation may not be very marked, even at the fourth month, the flaccid state is often so complete that the sensation of all resistance is lost, except to very careful bi-manual examination. It is here to be noted that, when our hand is placed first on the uterus, it may be in a state of contraction, consequently firm ; or it may be flaccid, so much so as not to be easily recognized. It is only by waiting that we can determine the variation of the density.

Let me apply these remarks to clinical practice. Supposing, then, that a single young lady is brought to us for amenorrhœa of four to five months' duration, and as an increase is noticed by her friends, an easy opportunity is thus afforded to us to make a superficial examination. And thus, without implying any suspicion, we can ascertain,

first, whether there be any swelling in the uterine region, and if there be, then whether it is permanently firm or of varying density. Should the latter be the case, then we have sufficient grounds to go further into the case and to proceed to internal examination. Even if the friends have not noticed a change in size, external palpation generally can be obtained and our suspicions negatived or confirmed. It will be fully recognized as a great advantage for us to be able to obtain decisive proofs of pregnancy before alluding to the subject, or even alluding to its possibility.

There is a condition of the pregnant uterus, which I believe has not been recognized except by myself, in which, at about the fifth month, the uterus during the intervals is very flaccid, scarcely to be felt except in one part, where a firm lump is to be felt, more like a tumor on one side. And this is very often associated with the death of the fœtus, which increases the deception, although it is true that in this condition of flaccidity the fœtus is more readily felt than when the uterus is firm. The diagnosis here is difficult between pregnancy simple, pregnancy with tumor, and extra-uterine fœtation, until we feel the uterus contract, when the whole is resolved into a solid ball till relaxation again occurs. The more solid portions mark the position of the placenta. In cases of pregnancy associated with fibroma, we are enabled, by watching these contractions of the uterus, to distinguish generally between the portion occupied by the pregnancy and that occupied by the tumor. But in cases in which the tumors are numerous, and the pregnancy early, it is not so easy, sometimes it is impossible.

We are sometimes called upon to diagnose between ovarian tumor and pregnancy at various periods, and we shall be able easily to recognize the uterus when we find the tumor to alternate in solidity. Again, supposing there is pregnancy and ovarian tumor, we can quickly distinguish the one from the other, if one tumor alters its condition of resistance. In case of requiring to distinguish extra-uterine fœtation from normal pregnancy, we have in the former case more difficulty, because our proof is negative. If it be normal pregnancy suspected to be extra-uterine, then the proof is more easy. Supposing we have a combination of the two, then a careful examination will sooner or later reveal which of the two is the uterus.

In twin pregnancy, where sometimes one ovum is dead and small, or one complicated with hydramnios, we have difficulty in determining the nature of one, whether it be a separate tumor; but when we find, as the uterus contracts, the variable parts brought together into one spheroid, we may conclude that the whole is within the uterus, and palpation and the stethoscope will easily reveal the dual contents.

In cases of over distention of the uterus, as by hydramnios (excess of liquor amnii) we lose to a large extent these contractions, and there is, therefore, a difficulty in distinguishing between it and a large ovarian cyst, though of course we have other helps. And in cases of mole pregnancy of the solid kind, or where the ovum is dead and the uterus has become more resisting in consequence, we find often the rigid contraction of its walls lasting for days together and thus become apparently solid.

It has been stated, though I have never observed it myself, that in case of soft fibromas of the uterus, there is an alteration of the density, but if this be so it can only interfere with our diagnosis between these cases and those of mole pregnancy and abortion, where there is menorrhagia. But there is generally, or has been, some interruption of the regularity of the menses; whereas, in the soft uterine growths there is menorrhagia which is seldom interrupted, unless the anæmia is very profound and of long standing; besides, the rate of growth of one is so different from the other.

Thus it will be seen that the diagnosis of pregnancy is in numerous instances made easy by the knowledge of the alterations of the firmness of the uterus, and I think it may be useful to add a few cases to those already set forth in former communications. The first one differs from any yet described.

Case I.—A former patient came to me complaining of very severe pain just above

the symphysis pubis, coming on in paroxysms, both day and night. She had not menstruated for two months, and I found the uterus enlarged, corresponding to the size of two months' pregnancy. I ventured to suggest that pregnancy existed, but she was very doubtful. She called again a month after, still much complaining of the severe paroxysms of pain. There was, however, no tenderness. The uterus had increased at the rate of natural pregnancy, but the fundus was very close beneath the abdominal walls, and doubtless there were adhesions, restraining the uterus from rising easily as it increased. All this time the uterus was hard and firm. At the next visit, another month after, the uterus had still increased proportionately and was readily felt above the pubes, so closely was it in contact with the parietes that it seemed as if it were a part of the wall itself, hard and solid; but as the amenorrhœa continued and the size of the supposed uterus was in accord with the date of the amenorrhœa, I considered it to be most probably pregnancy; but the pain and the constant solidity of the uterus was so great as to cast some doubts on the point. After a prolonged observation I was talking over the probabilities of the case, when I thought I would again try if I could find any variation, when, asking her to lie down, on placing my hand over the tumor I was much gratified to find it quite soft. The firm mass had changed to a soft, elastic one, as noticed in ordinary pregnancy. I could not then make out any indication of the fœtus, but she was conscious of its movements shortly after. This persistent contraction of the uterus is rare without some abnormal state of the ovum, by which it is sometimes caused; but itself may be expected also to be detrimental to the vitality of the fœtus, interfering with its circulation. In this case, however, there seemed no such effect, as in due time the child was born alive, though the mother suffered much distress during pregnancy.

CASES II AND III.—Two other cases have occurred in my practice where the uterus was invaded by fibrous growths, in which the difficulty of determining the exact nature of the condition was cleared away by the variation in density of the uterus. In one the woman had been married thirteen years without having become pregnant. At first the enlarging uterus appeared to the hand not as a pregnant one, but from the many fibrous growths seemed as if invaded only by growing fibroids. The amenorrhœa which accompanied the state enabled one to keep the possibility of pregnancy in view, and this was afterward made quite clear as the corpus uteri became distended; for as it contracted and relaxed, so the position of the old growths could be determined and the changed density of the intervening portions clearly defined.

The other case was of a similar kind, only the thinness of the tissues between the hand outside and the fœtus led to a suspicion of extra-uterine pregnancy, but this was negatived easily by the marked change of density when the internal action occurred, at which time also the outline of the fibroids could be easily made out.

CASE IV.—Suspected extra-uterine pregnancy. I was asked to decide whether the fœtus in a woman seven months advanced in pregnancy was placed within or without the uterus. The size of the abdomen was in correspondence with that of normal pregnancy, and the existence of a fœtus was also without doubt. The abdomen was examined only externally at first, and was soft, with only the fœtus to be felt; but in a few minutes the fœtus was less and less felt, till the abdomen was occupied by a firm pyriform mass which could easily be decided to be the uterus in contraction. This was quite evident when the contraction passed off, leaving the abdomen soft as before, and the fœtus easily made out as at first. This is an ordinary example of the assistance given in the diagnosis of pregnancy.

As a brief résumé of my papers on the subject, I may add the following remarks:—

1. That during the whole of pregnancy the uterus contracts at intervals, varying much, but commonly from five to twenty minutes, remaining contracted for a variable time, from three to five minutes.

2. If we place our examining hand at the time of contraction the uterus will be firm and pyriform, and the fœtal parts not easily detectable in general. If we place our hand on in a state of repose, or allow it to remain on till the firm contraction has passed away, then the outline of the uterus is found distinct—sometimes not to be felt at all—while the parts of the fœtus are more or less easily detectable, and can often be pressed by the fingers into various positions.

3. By noticing these facts we are enabled with ease, in general, to decide as to the existence of normal pregnancy, to diagnose between this and various tumors, both uterine and abnormal pregnancies, between pregnancy and distention of the bladder, and the conditions easily recognized by the practitioner.

4. That these intermittent contractions have the physiological use of emptying the uterine veins and thus changing the highly-carbonized blood for that more aerated.

5. From some observations I have made I am inclined to think that there is some closely constant relationship between this highly-carbonized blood accumulation and the fœtal movements, and between the fœtal movements and uterine contractions.

Finally, I can confidently commend to you this additional help in the diagnosis of pregnancy, one readily recognized and easily learned. It has, in my own practice, proved to be of the greatest service for many years.

## DISCUSSION.

The President called on Prof. SIMPSON, who opened the debate by expressing the indebtedness of obstetricians to Dr. Braxton Hicks for calling attention to the rhythmic contractions of the pregnant uterus, and their value in the diagnosis of pregnancy. Like other teachers of midwifery, he (Prof. Simpson) always insisted on the importance of attending to the alternate hardening and softening of the uterus, especially during the early months, when as yet the fœtus had not become so developed as to be recognizable by touch or auscultation, and in cases where the ovum had become addled or was undergoing degeneration. As regards the physiological effect of these uterine contractions, he thought it important to note the results of them at the close of pregnancy and the commencement of labor. There had been discussion between Winckel and others as to whether the uterine sinuses remained distended with blood or not. The probability was, as indicated by Dr. Braxton Hicks, that during contraction the uterus became anæmic. In Braune's frozen sections one could see that the walls of a uterus caught in diastole had had its vessels filled, while in the uterus caught in systole, when the walls were contracted and thickened, the vessels were empty. During each contraction the blood expelled from the uterus would first distend the blood vessels in the neighboring territories, in the cervix uteri and the vaginal walls. As a consequence of the engorgement of the capillaries of these structures there took place exudation, increased mucous secretion, and the softening of the tissues generally, which was sometimes called vital dilatation, and the full development of which was so important for enabling the practitioner to form a favorable prognosis in ordinary labor.

Prof. A. F. A. KING, Washington, D. C.—To have contributed any new factor by which the difficult matter of diagnosing early pregnancy can be facilitated, must afford great gratification to any one, for the subject is of the greatest practical importance; and no one, I think, can accord to himself this privilege more deservedly than the distinguished author of the paper to which we have just listened. I have, in common with most of the members of the Obstetric Section, made use of this means of diagnosis in practice, and, in common with most obstetric teachers in America, have brought it to the notice of obstetrical students. The only detracting

circumstance applying to the method of diagnosis under consideration is the impossibility of differentiating the intermittent contractions of pregnancy from those produced, under manipulation, in cases of foreign bodies, such as polypi, retained menses, etc., in the uterine cavity. The present paper of Dr. Braxton Hicks *does*, however, indicate the way in which fibroids of the uterine wall may be differentiated from the contractions of pregnancy. But even here, I think the method recorded would hardly avail during the early months. In fact, it may be said even now that the positive diagnosis of pregnancy during the first three months is practically impossible; at least I think no prudent obstetrician could venture a positive opinion in the case of a single woman at the end of the first three, or even four months. The value of Dr. Hicks' method in cases of *complicated* pregnancy is of great importance, but I will not attempt to say more upon this difficult subject than to contribute my mete of thanks for the contribution which the Doctor has kindly presented to the Obstetrical Section, in his paper.

Professor CHARPENTIER—I am very happy to have heard the communication of our colleague, Braxton Hicks, because I have had, myself, occasion to appreciate all its value.

A few years ago I was called by one of our confrères to see one of his clients, who in the course of a grave thoracic affection had been overtaken with excessive pains in the belly, with considerable enlargement and accumulation of fluid to such an extent that palpation was almost impossible. The suppression of the menses, which existed since three months, might have led one to suppose pregnancy, but there were no alterations in the neck of the uterus, and the grave condition of the woman—a state that had existed for several months—seemed calculated to remove that idea. My diagnosis was null, the first day.

The next day I tried anew the examination of the patient. After prolonged palpation, I was able to feel very distinctly some contractions, which enabled me to establish my diagnosis—pregnancy, complicated by acute hydramnios.

The condition of the woman was so serious that I did not hesitate to induce abortion at once. I penetrated within the uterus with a hysterometer, and I introduced the instrument as far as possible. After several trials about fifteen litres of fluid ran out, and during the night the woman was delivered of two male embryos, two and one-half months old. The woman recovered very rapidly. This fact struck my attention forcibly, and I never have failed, since this event, to emphasize this sign before my students, as well in my course of lectures as in my treatise. It is an excellent sign of pregnancy in its early stages, and which permitted me, in the case to which I have made allusion, to save the life of a woman who would certainly have succumbed without my intervention—intervention which was due only to the fact that I was able, thanks to the perception of the uterine contractions, to make an exact diagnosis, and come to the rescue immediately.

# VICARIOUS MENSTRUATION.

## MENSTRUATION VICARIEUSE.

## VICARIIRENDE MENSTRUATION.

BY PROFESSOR DUNCAN C. M'CALLUM, M.D.,
McGill University, Montreal.

From an early period, the possibility of hemorrhage taking place from some part of the body other than the uterus, as the immediate result of the suppression of the menstrual function, has been admitted by medical authorities and accepted as an established fact by the profession generally. This hemorrhage, replacing, as it were, the suspended monthly flow from the uterus, received the name of vicarious menstruation.

Dr. Wiltshire, of London, having published in the *Lancet*, of September 19th, 1885, an able and elaborate lecture on this subject, in which he quoted numerous cases placed on record as those of vicarious menstruation, affirms his full belief in the possibility of the phenomenon. There appeared in the following number of the same journal (September 26th) a letter from Dr. Wilks, in which this distinguished physician and observer expressed in decided terms his disbelief in its occurrence, "never having witnessed a case of the kind," and the wish "that some of the gentlemen at present living, of whom the lecturer makes mention, would record their cases in detail." "All the so-called cases of vicarious menstruation," he says, "which have come under my notice have broken down on investigation, so that I remain an unbeliever until I myself have witnessed an instance of it, or heard of one from some trustworthy witness."

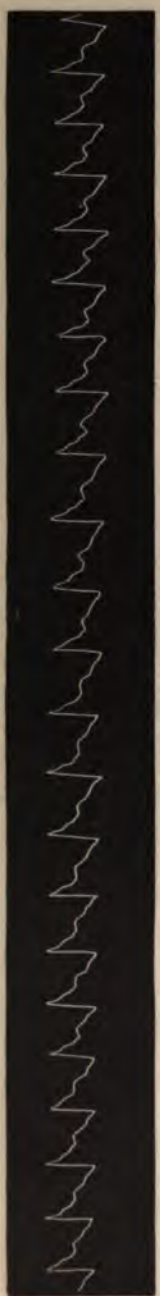
To this wish Dr. Robert Barnes responded, and in a paper read before the British Gynæcological Society he maintains, with his usual thoroughness and ability, the affirmative of the question. The reading of this paper gave rise to a prolonged discussion, the majority of those taking part in it supporting the views expressed by the author.

Modern opinion, then, as represented by the British School of Medicine, being divided on the question of the possibility of vicarious menstruation, I have thought that it would be of interest to the profession in this and other countries to obtain the views of this Section on the subject, particularly as the Section contains distinguished representatives of the Continental and American Schools of Medicine, and with this object I purpose bringing before your notice the details of four cases of this singular phenomenon, which have come under my immediate observation.

As there appears to exist a discrepancy of opinion regarding what really constitutes vicarious menstruation, it is of great importance, for the proper understanding of the subject, that an agreement should be arrived at on this point. For if it be claimed that the term be applied solely to cases in which for a long period, many months or years, the menses have been suspended and a periodical hemorrhage corresponding in time to the menses has taken place from some other part of the body than the uterus for the same period, the cases would be very rare—so rare, indeed, as to warrant the doubt expressed by many as to the possibility of its occurrence. But if the term be held to include all cases of hemorrhage occurring at the menstrual epoch, the menses being absent, and no other possible cause for the hemorrhage being present, whether the phenomenon be repeated or not at one or more succeeding menstrual periods, the cases would be more numerous, and there are probably many physicians in active practice who have met with one or more examples.

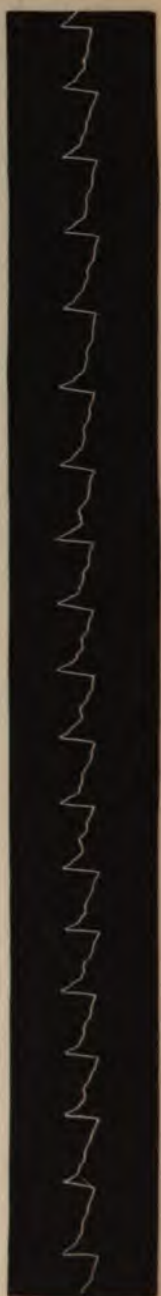
The object of the discharge of blood from the uterus at the time of menstruation would appear to be the reduction of the increased volume of blood and the relief of the consequent vascular tension, which are known to precede and accompany each menstrual period. The alterations that take place in the vascular tension at this time will be seen by the accompanying sphygmographic tracings, which show the tension present in the same person before, during and after the menstrual period. (See pp. 316, 317, 318.)

MISS McE., AGED 25; HEALTHY.



Three days before menstruation.

Two days after menstruation had commenced.



Two days after menstruation had ceased.

Under certain local vascular conditions, which may not always admit of ready explanation, the arrest of the menses and resultant non-relief of vascular tension by the passage of blood through the natural channel may be attended by an irruption of blood from some organ or part distant from the uterus. And this phenomenon may be repeated periodically so long as the two factors in its production remain unchanged. That the temporary arrest of the menstrual function is not sufficient alone to give rise to these ectopic hemorrhages is abundantly proved by their relative infrequency. Suppression of the menses is a condition which frequently engages the attention and comes under the care of the practical physician, but it is seldom attended by hemorrhage. It would appear, therefore, that something must be superadded to the amenorrhœa—some condition, not necessarily morbid, of the vasomotor nerves or of the vessels of the part from which the blood escapes.

CASE I.—Mrs. W. aged 36, was delivered of her sixth child on the 28th of July, 1886. She has never been able to nurse her children, in consequence of the complete failure of the secretion of milk in from ten days to a fortnight after its first appearance. She has always enjoyed excellent health, and she has never had a symptom indicating the existence of any serious disease of the stomach or liver. On the 19th of September, about two months from the date of her confinement, she experienced feelings of impending menstruation, and was greatly surprised that a sanguineous discharge from the vagina did not make its appearance. Two days after, without the slightest feeling of nausea, she vomited shortly after dinner, and her maid on removing the basin called her attention to the red color of the fluid parts of the matters vomited. Having taken one or two glasses of claret at dinner, the lady attributed the coloration to the presence of this wine and did not feel in the least alarmed. Within half an hour she vomited a second time, the matter vomited being pure blood, partly fluid and partly coagulated. The quantity was considerable, fully a pint, and its ejection was followed by great faintness. I was sent for, but before my arrival she had vomited a third time, bringing up about three ounces of blood, without much effort. The treatment consisted in perfect rest in the horizontal posture, and the administration of gallic acid, the patient swallowing at short intervals small pieces of ice. There was no further return of the hemorrhage, and with the exception of being somewhat blanched and less capable of exertion, the patient subsequently did not appear to be specially affected by the attack. About four weeks from the date of this hæmatemesis she again experienced sensations of impending menstruation, and on rising one morning she suddenly vomited about four ounces of blood. She immediately returned to bed, took small pieces of ice as before, and applied hot fomentations to the hypogastric region. Toward the evening the menses made their appearance and she had no further vomiting of blood. Since that time she has menstruated regularly, there has been no return of the hæmatemesis and she has not had a symptom indicative of gastric irritation or disease.

CASE II.—Mrs. M., aged 32, a healthy woman, pregnant with her fifth child, was suddenly seized at three o'clock on the afternoon of September 18th, 1876, with profuse hæmoptysis, which continued for about ten minutes and then ceased. The patient feeling relieved, and there being no immediate return of the bleeding, rest and perfect quiet were enjoined, and she was directed to take, occasionally, small pieces of ice. At one o'clock the next morning the hæmoptysis reappeared, and became alarming from its continuance and the quantity of blood lost. Various remedies were prescribed to arrest it, without success, and it only yielded to hypodermic injections of ergotine. Five grains were injected at a time and repeated every hour, and after the fourth injection the bleeding ceased. She was then in the third month of gestation, and the attack corresponded to what would have been, in the absence of pregnancy, her usual menstrual period. Three days after she aborted and expelled a small ovum with a greatly developed decidua. The loss of blood accompanying the separation and

expulsion of the ovum was very slight. Six weeks previous to the attack of hæmoptysis this lady, while out driving, was overtaken by a severe thunder storm, which alarmed her so much that she became faint, and on arriving at her home she had to be assisted from the carriage. By a careful examination of the chest the heart was found to be perfectly healthy, and the only evidence of existing lung irritation was an occasional cough to bring up pellets of dark blood. Neither before nor since the attack has there been the slightest symptom of tubercular phthisis or other disease of the lungs. Four weeks after the abortion she felt as if her menses were about to appear, but suddenly her face flushed, her breathing became somewhat oppressed, and she coughed up several mouthfuls of blood. This alarmed her very much. By rest and the continuous application of hot poultices to the lower part of the abdomen, the menstrual discharge appeared, and this was followed by immediate relief to the symptoms and the arrest of the hæmoptysis. From that time forward she menstruated regularly, and there has been no return of the hemorrhage from the lungs. She has since given birth, at full term, to two robust children, and she is now living and in excellent health.

CASE III.—This case occurred many years ago, and although I have not the full details, I can give the main facts from memory. It was that of a healthy unmarried female who, on the first day of a menstrual period, was exposed to severe cold which resulted in sudden suppression of the menses. She became flushed and feverish, and was restless and sleepless through the following night. At an early hour the next morning she had a severe attack of hæmatemesis, and the vomiting of blood was repeated two or three times. She recovered completely, and as in the other two cases, there was no evidence of disease of the organ furnishing the blood either before, at the time of or subsequently to the hemorrhage.

CASE IV.—This case is one for which I was consulted on the 20th of August last, and which I have now under observation.

Miss H., aged 33, a healthy woman, menstruated for the first time at the age of 14. Shortly after she had a severe attack of scarlet fever, and the menses were suspended from that time till the age of 18, when they reappeared and recurred at regular periods, and always accompanied by pain, until the age of 23. Without any obvious cause the monthly flow from the uterus then diminished in quantity. During the first two days of a period there was a thin, sanious discharge from the vagina, the quantity of blood lost not exceeding an ounce. This was followed and sometimes accompanied by epistaxis, which occurred at intervals for two or three days, the quantity of blood lost in this way amounting to fully three ounces. The epistaxis was always preceded by a feeling of weight in the head, drowsiness, and flushing of the face, which symptoms were relieved by the escape of blood from the nose. This phenomenon was repeated monthly for six consecutive months. Under treatment the menses were reëstablished and the epistaxis ceased. She has been perfectly regular from that time up to last April, when she had a return of the same conditions—scanty menstrual flow, with epistaxis—and they have been repeated at every menstrual period since that date.

Each of these cases fulfill the three main conditions demanded to constitute what I conceive to be a case of vicarious menstruation or vicarious hemorrhage, namely: (*a*) Absence of a flow of blood from the uterus at the menstrual epoch. (*b*) An irruption of blood from some other organ. (*c*) Absence of any cause for the ectopic hemorrhage other than arrested menstruation.

By what other name could a hemorrhage occurring under such circumstances be designated? It is truly supplemental. It takes the place for a time of a natural outflow of blood from the uterus. It fulfills, in the relief of vascular tension, one of the principal objects of the menstrual discharge. It is clearly a vicarious hemorrhage.

The second case which I have brought forward may perhaps be objected to as a case of vicarious hemorrhage, on the ground that the patient was pregnant when the hæmoptysis took place. But a fair consideration of all the conditions will, I think, prove it to be, on the contrary, a striking illustration of this phenomenon. Six weeks before the hemorrhage, the lady received a severe nervous shock, which undoubtedly resulted in the death of the ovum. Its further development was arrested—the decidua continued to grow, but no attempt was made by the uterus to expel the mass, which now was simply a foreign body in its cavity. A time having arrived which corresponded to her usual menstrual period, ovulation again became established. The surface of the uterus, from which the blood naturally escapes during menstruation, being to a great extent blocked by the hypertrophied decidua, there was an obstruction offered to its flow in that direction. The arterial tension being probably very great, and the condition of the pulmonary vessels favorable to their rupture, hemorrhage took place from the lungs, and subsequently the degenerated mass was expelled from the womb.

## DISCUSSION.

Professor RODNEY GLISAN, Portland, Ore.—I have had, in the course of thirty-nine years' practice, two or three cases of this rare anomaly. I shall only allude to my last case.

A girl, aged 16, consulted me about two years ago for cough and hemorrhage from the lungs. The attacks were regular, once every month. Upon inquiry I found that her first menstruation occurred at the age of 15, and she menstruated almost regularly for a year. Then menstruation ceased and hæmoptysis took place, attended with cough. This recurred monthly for one year, and then ceased on the reappearance of regular menstruation. As there was no cough and no hæmoptysis prior to the cessation of the menses, and there were regular recurrences of these symptoms during the cessation, and no return of hæmoptysis after menstruation again became regular, I have diagnosed this a case of vicarious menstruation.

Dr. IRA E. OATMAN, Sacramento, Cal.—I have seen cases which in my judgment were examples of vicarious menstruation. My views are that when menstruation fails to appear from any cause except pregnancy, the consequent vascular tension is apt to find relief through and from such regions of the body as are more susceptible to congestion.

I believe in the so-called vicarious menstruation—more properly, vicarious hemorrhage.

Dr. JOHN BARTLETT, Chicago, Ill.—I have notes of the following case: The patient, aged 23 years, unmarried, came under the care of Dr. Charles T. Parkes, in May, 1887. She had been ill for eighteen months or two years. Prior to that period her health was good. Menstruation, which began at the age of 12 years, was normal. For the past eighteen months alvine evacuations have been irregular, one, two or seven weeks intervening between the acts of defecation, until four months before the operation to be referred to, during which time no movement whatever of the bowels occurred. During this period, attacks of severe vomiting took place at intervals of three, four or six weeks. The ejecta were chiefly composed of stercoraceous matter. Urination was so interfered with, that during four months only one ounce of urine was passed in twenty-four hours. There was no albumen, no sugar. During the period of her illness, menstruation was very irregular. For two months prior to operative procedure, there was no evidence of normal menstruation. At the periods for the occurrence of this excretion, however,

she had hæmatemesis, spitting several mouthfuls, as the patient expressed it, of pure blood. This flow, which was regarded as a vicarious menstruation, was preceded by a peculiar distress or pain at the epigastric region, and severe nausea. The blood discharged was apparently normal, not acted upon by the acids of the stomach.

The patient, when she presented herself to Dr. Parkes, was almost a physical and mental wreck. Her sufferings, which had not been mitigated by all the general and local treatment which the intelligent physicians of her locality could suggest, had led to the opium habit, so that the patient was in a high degree hysterical. The abdominal surface was extremely hyperæsthetic, and in places covered with a herpetic eruption. She had a deep-seated pain in the right iliac region, radiating down the lower extremity.

Considering the desperate condition of the patient and the failure of all means of relief, an exploratory abdominal incision was determined upon. The small and large intestines were found to contain nodules of the size of a walnut. Both ovaries were found enlarged to twice the normal size, the stroma destroyed with the formation of sacs containing fluid. They were removed, with their tubes. The wound healed by first intention. Within twenty-four hours after the operation the secretion of urine was increased to one pint. The fourth or fifth day scybalous masses passed spontaneously. The herpetic eruption had disappeared by the seventh day. Her health steadily improved and she increased in weight. Two months after the operation she began with regularity to spit blood, experiencing, as regards the stomach, the same symptoms as before. The hemorrhage occurred every three or four weeks. The lungs and heart were normal.

Dr. Nelson—Have seen but one case that could properly be called a case of vicarious menstruation. In this case the vicarious discharge was from rectal hemorrhoids.

Mrs. K. S. was admitted to the Woman's Hospital of Chicago May 3d, 1880, when the following history was obtained: Age 35; American; married fifteen years; no children; appetite poor; condition of bowels varies—usually free, especially once in the month. Has frequent and copious hemorrhages from the rectum, from hemorrhoids. Has dysuria when the piles are troublesome. Hemorrhages much worse from a week to two weeks each month, often producing faintness. Has not menstruated for fourteen years. Was treated ten years ago for ulceration. Uterus one and three-quarter inches deep. Is very anæmic, from hemorrhages.

Under ether the sphincter ani was fully dilated, and the rectal mucous membrane deeply scarified throughout its whole circumference, and then fuming nitric acid applied freely. The patient was put to bed, anodynes given as required, and the stools kept soft.

The patient was in hospital nearly a month, and when discharged was rapidly gaining in strength, flesh and color. After leaving the hospital, a few applications of a stimulating character were made to the uterus, perhaps half a dozen during the next three months.

The menstrual flow returned, moderately, three or four times, and the uterus attained the depth of two inches.

But her husband then became insane and was sent to an asylum, and the patient was lost sight of and the result of the treatment not known. But it would seem probable, had her domestic condition been more fortunate, the uterus would have resumed its normal function.

When last seen, there was no return of the hemorrhoids.

The patient was under treatment and observation some six months in all.

Dr. W. W. JAGGARD, in the absence of the author, read the following paper :—

# MECHANICS OF THE DELIVERY OF THE CHILD'S HEAD BY FORCEPS, WITH DESCRIPTION OF THE NEW NORMAL FORCEPS.

## MÊCANIQUE DE LA DÉLIVRANCE DE LA TÊTE DE L'ENFANT POUR LE FORCEPS, AVEC LA DESCRIPTION DU NOUVEAU FORCEPS NORMAL.

## DER MECHANISMUS DER ENTBINDUNG DES KOPFES MITTELS DER ZANGE, NEBST BESCHREIBUNG DER NEUEN NORMAL-ZANGE.

BY T. LAZAREWITCH, M.D.,

Prof. Emeritus, St. Petersburg, Russia.

It is indispensable to have a perfect acquaintance with the expelling, directing and opposing powers which are in action during the extraction of the head by the forceps, if we desire to execute this very important operation without any mistake. The expelling force can be produced by the contraction of the fundus of the uterus, by the contraction of the diaphragm, by the abdominal muscles, and occasionally by the hands of the operator pressing upon the fundus of the uterus. It is necessary to observe that when the uterus deviates from the axis of the pelvis, or when the uterus, after the rupture of the membranes, takes an oblong form and forcibly grasps the fœtus, in these cases the uterine contractions are unfavorable to the action of the forceps, because they retain the fœtus. It is not well, during the application of the forceps, not to pay attention to the irregularity of the position and form of the gravid uterus. Cases frequently occur when the cervix of the uterus is in a congenital lateral position, and then the more pronounced this anomaly is the more its injurious influence upon the mechanism of labor. The important relation of the congenital lateral position of the uterus to the labor I elucidated at the Medical Congress at Odessa, and at the International Medical Congress in Copenhagen.*

I have noticed that the impressions, more or less deep, produced by the blades of the forceps jamming the skin of the child's head, which are of a rosy or dark-bluish color, correspond in form to the curve of the end of the blades. This impression I have found more frequently on the cheek bones or on the temples, or on the forehead and on the occiput. Inspecting the child's head after each case of the application of the forceps and making sketches of it, I have found that when the colored impressions were produced on the cheek bones they were at a distance from the protuberance of the temporal bones equal to the half of the arc of the blade. I name this part of the blade, according to its mode of action, the *grasping* part of the forceps (Fig. 1, *a b*), and all the remaining portion of it the *directing* part. These names correctly define the *rôle* of the corresponding parts of the forceps.

The extraction of the head is performed only by the *grasping* part of the blades, which acts as an expulsive power (*vis a tergo*) pushing the head from above. The *directing* parts of the blades (Fig. 1, *b c*) act as main-rails ; they give the direction to the head, keeping it between them while in movement. By pressing the head from above, the blades aid in the same manner as the contractions of the fundus of the uterus and the hands in the operation *expressio fœtus*.

When the vertex of the head is presented like a cone, corresponding by its base to

* T. Lazarewitch, *Déviation Latérale Congénitales de la Matrice. Annales de Gynécologie*, 1885, Juillet, p. 20.

the inlet of the pelvis, the grasping parts of the blades press on its lateral inclined planes. The greater the surface on which the blades act, or the more curved inward the blades are, the greater will be the expelling power.

My parallel forceps, whatever be the size of the head, preserve the same grasping power, while in all other forceps this power diminishes in proportion as the head is greater. The blades of ordinary forceps approach each other in the lock, and according to the size of the head the angle between them increases or diminishes. Thus, when the head becomes larger the distance between the ends of the blades is greater and their grasping power diminishes to zero. In order to preserve unchanged the grasping

Fig. 1.

*a b*—grasping part of the blades.
*b c*—leading part of the blades.
*d*—rounded part of the arms.

Fig. 2.

*a b*—The handle of the normal forceps—natural size.
*c d*—The tension of the lock.
*e e*—The mortise.
*f*—Projection of the tenon.
*g*—The screw.

power when the distance between the blades increases, I have constructed a lock which gives us the possibility of preventing the slipping of the forceps by preserving the same inclination of the blades to the head of every size. The lock is constructed with a tenon entering freely into the large mortise made in each branch of the forceps (Fig. 2), the tenon being fixed by a screw in one branch which is retained at the desired distance from the other by a projection constructed on each side of the tenon. This lock, having a very simple construction, admits easy and sure locking of the halves of the forceps and at the same time their mobility, by turning each

half on the longitudinal and transverse axis. This variation of the position of the blades renders it possible to accommodate them to the child's head and to the walls of the parturient canal.

During traction with the forceps, one power acts on the head *from above*, moving it along the parturient canal, and the other acts on it *from the sides*, pressing to it at the same time the blades of the forceps. This latter power, exerted by the walls of the pelvis, is the greater the more considerable the resistance to the movement of the head. The power acting from the sides may also be produced as an additional power by the hand holding the forceps. The use of this additional power, being injurious, ought to be entirely avoided by the proper construction of this instrument. While traction is being made with the forceps the head moves out of the pelvic canal with the blades, and while it is in the parturient canal the blades are pressed by its walls. The pressure increases as the head approaches the narrower diameter of the pelvis. When at this time it is pressed in another direction by the hand holding the handle of the forceps, this pressure must increase if in the same diameter in which it is already pressed by the walls of the pelvis. Not only for the living, but for the dead child, no advantage is gained by applying the additional compressing power of the hands, because in places violently compressed the head may lose that elasticity and convexity which are indispensable for the prevention of the slipping of the forceps.

In order to guide a body through a curved or tortuous canal, it is not necessary to use in the same manner curved branches of the instrument grasping this body and moving it. At the first moment of the movement the relation of the curves of the branches to the curvature of the canal will be changed. The branches of the instrument may be straight, like a stretched cord, if the curvature and breadth of the canal admit of the insertion of the straight instrument. Once being placed, it can be moved in the same direction. The straight direction of the acting power undoubtedly is preferable to all others. When the head is high the straight forceps, by pressing the perineum, may be placed without any difficulty in the axis of the inlet of the pelvis.

The pelvic curve in the blades of forceps is not only useless, but it may also cause injuries by rendering it difficult to ascertain the direction of the acting power and correctness of movement communicated to it, as is possible by the employment of straight forceps.

When the forceps with the pelvic curve are applied to the head situated in an oblique diameter of the pelvis, one blade generally presses the head with the anterior and the other with its posterior margin. Hence, on the one hand, the posterior margin not being in contact with the head, is not only useless, but has even an injurious effect; on the other hand, the same action is produced by the anterior margin of the opposite blade.

The pulling of the head through the parturient canal by my normal forceps is facilitated on account of their right conoid form. This form gives the possibility, without drawing out the blades, of placing them in every one of the diameters of the pelvis —transverse, oblique or conjugate.

In order to appreciate the essential conditions of good forceps, we should bear in mind the general leading ideas, based on definite, positive data, and above all on mechanical exigencies. Then there would no longer exist such varieties in the size of the forceps, in the curves and the breadth of its blades and in the movability or immovability of its lock, which cannot be indifferent as regards the convenience of the operator and the safety of the persons subjected to the operation.*

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* T. Lazarewitch, "On the Obstetrical Forceps." London, 1881. *Transactions International Medical Congress*, p. 13.

In improving forceps we should pay attention to the following conditions:—

1. The forceps should be, as it were, a continuation of the hand, rendering it possible to grasp the head confined in a limited space, and serving as feelers to transmit the impression to the sensitive nerves of the hand holding the instrument.

2. The less the dimensions of the blades of the forceps, the more skillfully may it be guided, and the less injury may result from its incorrect application. It is clear that the blades with the pelvic curve require more space than those which are straight.

3. The detrimental action of the blades will increase with their breadth and the rigidity with which their parallelism is maintained. The perineum is generally ruptured by its distention when the head emerges; if the head is held with parallel broad blades, they, increasing the distention of the perineum, may coöperate in its rupture.

4. The convex margin of the extremities of the blades should not be so thin as to cut and wound the soft parts of the mother, nor so thick as to obstruct the introduction of the blade under the thin distended margin of the os uteri, when it holds the head firmly. At 2.0 cm. from the tips the upper and lower margins of the blades should be somewhat thicker, so that during traction the soft parts of the mother might not be wounded by them.

5. When the head is in a high position, the forceps with their arms distend the perineum less in the transverse direction, but more violently in the direction to the coccyx. To prevent rupture of the perineum the arms, from the blades to the handle of the forceps, should be rounded and not thin. The rounded arms, by the pressure on the perineum, distend it more equally.

6. The lock of the forceps should admit easy and sure locking of the halves, at the same time admitting the possibility of turning each blade a little on the longitudinal and transverse axis. This variation of the position renders it possible to accommodate them to the fœtal head and to the walls of the parturient canal.

7. It is very important to have the possibility, in every size of the head, to retain the blades in parallelism by a desirable divergence, which is possible by the construction of my lock.

8. The handles of the forceps are estimated according to the convenience of holding and guiding them, and in what degree superfluous and detrimental pressure of the head may be dispensed with. In my forceps this pressure from the additional and injurious power of the hand is entirely avoided by a particular construction of the lock.

9. In order to keep the forceps perfectly clean they ought to be made of one metal, and without superfluous fissures, excavations, screws, nuts and all other complications.

10. The pelvic curve in the blades is not only useless but it is very prejudicial. The ends of the blades do not grasp the head perfectly. It is difficult, or impossible, to place the curved blades in the oblique or conjugate diameter of the pelvis.

During twenty years I have been improving my parallel forceps; by little and little I have brought them to such perfection that I think they correspond to all the above-named demands, and I have some reason for giving them the name of *Normal Forceps.*

They are made of steel covered with nickel. They are 34.5 cm. in length. The blades have some elasticity, all their surface is smooth and polished. At a distance of 2.0 cm. from the end the blade is 4.2 cm. wide, and from here grows gradually narrower to 1.0 cm. in the neck. The fenestrum of the blades has the form of an elongated oval 2.8 cm. wide and 9.7 cm. long. The cephalic curve has a radius of 20.0 cm. The inner surface of the handle is 2.7 cm. in width and 9.5 cm. in length. The tenon of the lock is 2.0 cm. wide, 6.5 cm. long and 0.5 cm. thick. The mortise is 2.3 cm. long and is 0.7 cm. wide.

My parallel straight forceps I have several times employed when the head was low; when the head has been high I have employed them with full success in nine cases, and with their last improvement in two cases. These cases, presenting considerable difficulties, prove that straight forceps may be employed with success, even in the most difficult extractions of the head. In some of these cases I am convinced that the curved forceps would not be applicable, or not effective, or even injurious.

For the application of my *normal* forceps I observe the following rules: When the head is in a high position, and the patient is lying across the bed, the operator, after introducing the blades, must give them a direction corresponding to the axis of the inlet of the pelvis, which is parallel to the interior surface of the symphysis pubis, very accessible to investigation. This is easily accomplished by pressing on the anterior margin of the perineum in the direction of the coccyx. The traction along the axis of the inlet is facilitated when the operator takes a position on his knee, then his shoulders are lower than the handles of the forceps.

In the first case in which I took this position in extracting with my straight forceps, it struck me that, after some useless, strong and very painful tractions, when I sank down on my knee it was at once easy to give a regular position to the blades, and the head was extracted without difficulty.

When the head is near to the coccyx the position of the forceps and the direction of the acting power must be in the axis of the cavum of the pelvis, parallel to the inferior part of the sacrum, accessible to examination. The traction must be made in a horizontal direction, for which it is more convenient to operate sitting on a chair. Then the power acts in the direction of the bent forearms, by the extensor muscles.

When the head has passed the sacrum and the vertex protrudes through the vulva, the position of the forceps and their traction must be changed to the direction of the outlet. It is more convenient to execute the traction for delivery standing and holding the forceps with the right hand, and at the same time supporting the perineum with the left. For the delivery the direction of the traction must be parallel to the perineum.

My normal forceps I have successfully applied in one case of *presentation of the pelvis*, without any injurious compression. In such cases the blades must be applied as far as possible to the bi-trochanteric and transverse diameters of the pelvis. The extraction must be made very slowly.

## IMPROVED FORCEPS.

### FORCEPS IMPROUVÉES.

### VERBESSERTE ZANGEN.

AS DEVISED BY WM. S. STEWART, A. M., M.D.,

Professor of Obstetrics and Clinical Gynæcology in the Medico-Chirurgical College of Philadelphia, Pa.

The cut represents an improvement made in the obstetric forceps; the handles being parallel instead of crossed, and applicable to any form of blade.

The advantages of this improvement, which have been demonstrated by experience, are as follows:—

First. The application of either blade first, which is not possible with the instruments in use, on account of the crossing of the handles and the arrangement of the lock. In some cases, especially second position of the vertex, when the second or right blade cannot be introduced after the first or left blade is in position, it is the only instrument which can be used without risk of injury (to mother and child).

Second. The impossibility of its slipping, if the blades have been properly applied.

Third. Moderate and even compression; the degree of compression being regulated by the amount of resistance.

Fourth. Greater facility for making traction.

### DISCUSSION.

Prof. THOMAS OPIE, of Baltimore, said: There is a manifold variety of forceps, but the principles which underlie their action are very much the same.

There is a great advantage in using one pair of forceps, especially if the holder thinks it the best of its kind, or has modified it to suit his own views. The more he uses them the more skillful he becomes with them; his tactile sense is adapted and educated to this particular instrument. There is much more in the skill of the operator than in the form of the forceps, the most of those in use being good—some admirable.

The instruments just shown us, I have no doubt are efficient in the hands of the gentlemen who have devised them, but I do not think they will be generally received as superior, or even equal, to many now in use.

The forceps of Lazarewitch would fail to obtain general endorsement, if for no other reason, because they are straight forceps. Forceps are relatively valueless when applied at the superior strait unless they have the pelvic curve, and they are rendered vastly more efficient by traction rods. I do not think the straight forceps have an advantage over curved ones at any part of the obstetric canal. The cases

in which they would afford an advantage of any kind whatever would be most exceptional.

I take issue with the statement which has been presented, claiming for this instrument a *vis a tergo* action. The operator furnishes the manual power. After closing the blades upon the head he exercises the requisite traction through the handles or traction rods. This is the *vis a fronte*. The powers of the uterus, abdominal walls and diaphragm are the *vis a tergo*.

There is much confusion growing out of the claim for the forceps that they are levers, rotators, compressors and the like. If they are entitled to such credit, the occasions for such use are exceedingly rare. The blades grasping the head are, as it were, an extension of our own hands, making a grasping or compressing power directly proportional to the tractile effort.

The ingenious modification, by Prof. Stewart, of the old forceps with parallel blades, does not seem, to me, of practical utility. I do not think the compression made by the blades on the child's head can be regulated in the same intelligent and safe way as with the ordinary forceps with crossed blades. There is no regulator of compression like the experienced and educated hand.

An advantage is claimed for these forceps in certain cases when there is difficulty in introducing the second blade, and in locking them. It is very seldom, when forceps are indicated, that there is serious trouble in the introduction of the second blade, and when the blades will not lock readily it is a valuable notice and warning that they are not applied to the sides of the head, and that we must proceed with great care.

Another drawback to their use, seemingly, is that they are complicated and hard to keep clean.

During the session two hundred members were present.

A cablegram from Prof. LUDWIG BANDL, Vienna, conveying greetings to the members of the Section on Obstetrics, was read.

Adjourned at six o'clock.

# SECOND DAY.

TUESDAY, September 6th.

The President, Professor DE LASKIE MILLER, in the chair.

## THE INFLUENCE OF LEUKÆMIA UPON PREGNANCY AND LABOR.

### L'INFLUENCE DE LA LEUCOCYTHÉMIE SUR LA ACCOUCHEMENT.

### DER EINFLUSS DER LEUKÄMIE AUF SCHWANGERSCHAFT UND GEBURT.

BY PROFESSOR JAMES C. CAMERON, M. D.,

Of McGill University, Montreal, Canada.

Our knowledge of leukæmia is at best fragmentary and incomplete, for its etiology is uncertain, its course and symptoms variable, and its treatment unsatisfactory. It occurs more frequently in men than women (at least 2 : 1, according to Osler*), but even in the few recorded cases of leukæmia in women, the effect of the disease upon the reproductive functions is barely mentioned. Thus, we find it stated that sometimes menstrual and sexual disturbances are among its early prodromata ; that it is most frequent at the climacteric ; that in a few cases it has developed during pregnancy or after several miscarriages or difficult labors ; that it has occasionally followed the sudden suppression of the menses from cold ; that in non-pregnant leukæmic women amenorrhœa is the rule, though menorrhagia has been occasionally observed. Uterine hemorrhage seems to be rare, for Mosler† says that in 81 cases of leukæmia observed by himself and Ehrlich, hemorrhage occurred in 64 cases, only three of which were from the uterus. In 21 cases of leukæmia in women observed by Mosler, disorders of the reproductive system occurred in 16.‡ M. Vidal § says that in 4 out of 10 cases pregnancy is the commencement of the disease in women. By a careful search through the literature of the subject, I have been able to find reports of only four cases where leukæmia was alleged to have occurred in the course of pregnancy ; none are recorded where a woman, already leukæmic, has been known to become pregnant.

A case was reported by Dr. Ingle to the Cambridge Medical Society, in 1880.‖ The patient, æt. 33, when near her confinement, showed extreme pallor and weakness. On examination, the blood showed none of the changes characteristic of pernicious anæmia, but there was a marked increase in the number of white corpuscles, so that W : R = 1 : 20. After a natural labor, with very little bleeding, the symptoms persisted and fainting fits began, but she recovered completely under a course of iron. She had

* "Pepper's System," Vol. III, p. 909.

† *Ziemssen Cyclop.*, Vol. III, p. 385. ‡ *Ibid.*, Vol. VIII, p. 506.

§ Dictionnaire Encyclopédique des Sciences Médicales. "Leucocythæmia."

‖ *Lancet* (London), 1880, Vol. I, p. 334–5.

suffered in a similar way toward the end of her last confinement, but regained her health in the interval.

In May, 1870, Dr. Robert Paterson read a paper before the Edinburgh Medico-Chirurgical Society, on "Acute Leucocythæmia in Connection with Pregnancy," * in which he reported three cases, one of them fatal upon the eleventh day, and another upon the fourteenth day after delivery. These cases, though interesting, are not very satisfactory, because in none of them was a careful blood count made, the W : R being only roughly estimated during an ordinary microscopical examination. In neither of the fatal cases was an autopsy permitted. The first case reads very much like one of acute puerperal septicæmia, and in the second also septicæmia was probably an important factor. Dr. Paterson attributed death in both cases to the more or less rapid enlargement of the lymphatics of the throat, neck and upper part of the chest. He says that he has watched a number of cases during the latter months of pregnancy, and he has always found that where there was marked sallowness of the skin, with general languor and tendency to faint, the blood was always crowded with leucocytes, even though spleen, liver and glands were not enlarged, and that whenever these symptoms were absent, leucocytes were not abnormally abundant.

I have been unable to find the records of any other cases at all bearing upon the relations between leukæmia and pregnancy.

The following case, which I have still under observation, is unique, and besides possessing some points of peculiar interest, it throws some new light on the subject.

Mrs. S., æt. 36, VII-para, was first brought under my notice in October, 1886, by Dr. George Ross, Professor of Clinical Medicine, McGill University. She was then seven months pregnant. During the previous autumn she had been under treatment for leukæmia in the Montreal General Hospital, in the clinical wards of Dr. R. L. MacDonnell, to whom I am indebted for the earliest reliable report we have of her condition. Briefly, her history at that time was as follows :—

Sept. 15th, 1885, Mrs. S. entered the Montreal General Hospital, complaining of vomiting and a tumor in the left hypochondrium. She has been married fourteen years, has had six children (the youngest being then three months old), all living and all subject to attacks of jaundice more or less severe.

*Rheumatism :* one attack at the age of thirteen.

*Malaria :* never had an attack, though she lived in a malarious district in England till the age of fifteen. She came from England to Montreal about three years ago.

*Jaundice :* since marriage she has had occasional attacks, ushered in by chills, vomiting and slight abdominal pain.

*Epistaxis:* ever since childhood has had occasional attacks.

*Diarrhœa :* a common symptom.

*Syphilis,*
*Alcoholism,* } Negative.
*Injury,*

*Menstruation* began at age of thirteen ; always scanty, intervals sometimes prolonged to six weeks ; no pain till the last three years, since which time she has suffered pain in back, pelvis and groins.

*Splenic tumor* was first noticed by her about a year ago, at the *beginning* of her sixth pregnancy.

*General health* is impaired, and she has been losing flesh for three years, though in the intervals of her icteroid attacks she feels fairly well, but weak.

*Present attack* began ten days ago, with a severe rigor, followed by fever. Then

* *Edin. Med. Jour.*, Vol. xv, p. 1073–8.

followed anorexia, nausea, vomiting, constipation, sleeplessness, slight cough and increasing feeling of weakness. She nursed her baby till the milk ceased, a few days ago.

*Physical examination:* she appears weak, pale and anæmic, conjunctiva pearly, no jaundice, but a sallow tinge of skin; muscles soft and flabby; temperature 103° F., pulse 104, regular and of good volume; respiration 28; tongue coated and moist; attacks of vomiting three or four times daily; skin harsh; no œdema, ascites, or enlarged veins.

*Splenic tumor* extends from the sixth left rib obliquely downward toward the umbilicus, and backward to the post-axillary line; oblique measurement, 23 cm. (9 in.); feels firm and smooth, and is notched on the anterior edge.

*Liver:* dullness begins at the fifth rib and extends 5 cm. (2 in.) below the costal border; in the mammary line it measures 16.5 cm. (6½ in.); border sharp and well defined; surface smooth and firm. There was moderate tenderness over both liver and spleen, and moderate tympanites, though the abdominal walls were flaccid.

*Lymphatic glands* not enlarged.

*Heart:* apex beat between fifth and sixth ribs, 11 cm. (4½ in.) from mid-sternum. The area of dullness was considerably increased, beginning above at the third rib, and transversely about mid-sternum. There was a systolic murmur, soft and blowing, maximum at apex, transmitted up to pulmonary cartilage, but not around to the left. Second sound normal at the pulmonary cartilage, but very feeble at the aortic cartilage.

*Lungs* clear throughout.

*Urine:* a heavy deposit of lithates.

*Retina* enlarged.

| | | | | | |
|---|---|---|---|---|---|
| *Blood:* | September | 17th, | red corpuscles per cmm., | 2,400,000; | W : R = 1 : 40. |
| | " | 25th, | " " | 2,900,000; | W : R = 1 : 17. |
| | October | 31st, | " " | 2,480,000; | W : R = 1 : 12½. |

November 2d she left hospital, and gradually regained health so as to do housework without much fatigue.

January 28th, 1886, her menses reappeared and lasted one week, varying in amount from day to day; very little at times, and again at times so profuse as to compel her to lie down for an hour or two, from sheer weakness.

March 28th, menses reappeared again, but were very scanty. Soon afterward morning sickness began, and during the next few weeks there were several attacks of epistaxis and melæna. The urine became high-colored and scalding, and over the hepatic region dragging pains were felt, increased by extra work.

April 28th, she again entered hospital; the spleen was found to be somewhat sensitive, but the liver was so tender that she could not bear the slightest pressure. There was slight dyspnœa, but no œdema of feet or legs; no fever or thirst; lips and gums were pale, tongue clean, moist and indented; appetite failing; temperature 98.4° F., pulse 74; abdominal walls flaccid.

*Spleen:* lower end extends downward to within 7.5 cm. (3 inches) of the left anterior superior spinous process. The vertical line of dullness in mid-axillary line was 15 cm. (6 inches), the oblique line 24 cm. (9½ inches).

*Hepatic* dullness extended from the sixth rib to the costal margin.

*Blood:* red corpuscles per cmm., 3,400,000; W : R = 1 : 50.

She was put upon a course of arsenic and iron.

May 3d: red corpuscles per cmm., 2,900,000; W : R = 1 : 45.

Was discharged from hospital.

October 8th she again entered hospital, and for the first time came under my care. Her health was good all summer till about a week ago, when she had a sudden attack

of vertigo while ironing; she fell to the floor and remained unconscious for about half an hour. Ever since, she has suffered from constant headache. The next day she felt soreness over the epigastrium, aggravated by movement. Temperature 98.6° F., pulse 108, respiration 20.

*Œdema* of face, feet and legs, varying in degree according to her position. Thirst, anorexia, vomiting; no diarrhœa; dyspnœa on the slightest exertion; dyspnœa is gradually increasing; epistaxis occasional and slight.

*Urine* orange-yellow in color, acid, specific gravity 1015, contains ten per cent. of albumen, no sugar or casts.

*Splenic dullness:* oblique line of dullness measures 28 cm. (11 inches).

*Hepatic dullness* measures 15 cm. (6 inches).

*Blood* is pale and watery looking. Red corpuscles per cmm., 1,070,000; W : R = 1 : 10. Hæmoglobin very pale, red corpuscles small. After this time she had repeated attacks of epistaxis and diarrhœa; the dyspnœa and œdema became rapidly worse, till at last she could not lie down at all, and could get a few snatches of sleep only when sitting in a chair or in the knee-elbow position. During the two days immediately preceding labor the attacks of epistaxis were frequent and uncontrollable, continuing a couple of hours and then suddenly stopping. She grew so weak and faint that her condition became alarming, and it was with great difficulty that she was removed from her own home to a private ward in the University Maternity Hospital. Soon after her arrival there slight labor pains began; in about three hours the liquor amnii came away, and along with it the child (October 29th). Not a drop of blood was to be seen. Frictions were kept up over the fundus for an hour and a half, and then the placenta was carefully pressed off. Not a drop of blood was lost either then or afterward. Involution was excellent. The lochia were scant and slimy, quite bloodless, and ceased in a couple of days. For a time she was bothered with a little diarrhœa, due to impacted scybalous matter. Her appetite was ravenous and could scarcely be controlled. A thin watery fluid could be squeezed from the breasts, but there never was any tension or flow of milk. She convalesced rapidly, and was discharged from the hospital on November 9th.

*Child:* a female, born on the 214th day from the cessation of menstruation, weighed 4¾ lbs., measured 18½ inches, was apparently strong, slept well, nursed vigorously from a healthy breast, and throve nicely the first day. The next day, however, contrary to orders, the mother clandestinely put the child to her own breast. It sickened at once; in a few hours a purpuric rash appeared on its face and spread slowly over its back and chest; it vomited and purged, and in spite of every care died on the fourth day.

*Blood:* two hours after the birth of the child.

| | | | |
|---|---|---|---|
| Mother: | red corp. per cmm., | 990,000; | W : R = 1 : 4. |
| Child: | " " " " | 5,210,000; | W : R = 1 : 175. |

At the end of the third, another count was made—

| | | | |
|---|---|---|---|
| Mother: | red corp. per cmm., | 1,100,000; | W : R = 1 : 20. |
| Child: | " " " " | 5,000,000; | W : R = 1 : 150. |

November 9th, on discharge from hospital, her blood showed—

red corp. per cmm., 1,900,000; W : R = 1 : 35.

The placenta was sent, for examination, to Dr. W. G. Johnston, Demonstrator of Pathology, McGill University. The following is his report:—

*Placenta:* 18 hours after delivery. Nothing special in its appearance. Normal size. Blood in sinuses looks thin, pale and watery; that in placental vessels only slightly clotted, in most places quite fluid and darkish in color.

With the Hæmato-Cytometer (Zeiss-Thoma) :—

*Pl. Vein:* Trunk. Red Corp. per cmm., 4,610,000; White 26,000; W : R = 1 : 173.
*Pl. Vein:* Branch. Red Corp. per cmm., 4,600,000; White 36,000; W : R = 1 : 128.
*Pl. Artery:* Red Corp. per cmm., 5,410,000; White 20,000; W : R = 1 : 270.
*Pl. Sinuses:* Red Corp. per cmm., 950,000; White 263,000; W : R = 1 : 3.6 nearly.

*Note.*—The average of three counts was taken. The maximum and the minimum were very near the average; no marked difference in any count; it was under 5 per cent., which is the error allowed by this method.

*Hæmoglobin:* not estimated.

*Microscopic* examination of the blood showed some nucleated red cells in samples from the artery and vein, but not in abnormal numbers. Nothing special in the white cells on examination by Erlich's method of fixing and staining.

*In the Sinuses* a large number of small, pale cells were found, highly refracting and difficult to distinguish from leucocytes. They were over $\frac{1}{10}$ the number of red cells. In estimating the number of white cells, only those were counted which were obviously of that nature; doubtful cells were not included in either count. Nucleated cells were not specially numerous in the blood.

*Autopsy upon the Infant:* ten hours after death. Body fairly well nourished, numerous petechial spots about face, thigh and neck, otherwise nothing special externally.

*Thymus and Thyroid:* nothing abnormal. Organs all normal; spleen not enlarged; Malpighian corpuscles distinct, but not enlarged.

*Blood:* fluid and dark-colored; nothing special on microscopical examination.

*Bone-marrow:* red and abundant everywhere; nothing special microscopically.

A further careful microscopical examination of the organs showed that no collections of leucocytes existed. The thymus, thyroid and spleen were normal.

After her discharge from the Maternity Hospital, she enjoyed tolerably good health, her color improved, the œdema and dyspnœa disappeared and she gradually resumed her household duties. Her menses appeared in December and returned regularly every month, but now for the first time in her life the flow was profuse and bright red. They last appeared on April 28th, and shortly afterward she again became pregnant. A little blood was occasionally vomited in the mornings. The splenic tumor began to enlarge again, just as it had done before when she became pregnant.

*July 12th:* the oblique line of splenic dullness measures 20.5 cm. (8 inches), and the anterior edge of the spleen reaches to within 9 cm. (3½ inches) of the umbilicus.

Downward in the axillary line, the dullness extends 20 cm. (8 inches), reaching the crest of the ilium. There is no increase in the hepatic dullness.

*Blood:* Red Corp. per cmm., 1,406,000; W : R = 1 : 20.

*August 18th:* she is looking paler and more puffy. Splenic dullness about the same.

*Blood:* Red Corp. per cmm., 1,373,000; W : R = 1 : 3.

Since the last count the red cells have not diminished very much, but the white cells have enormously increased.

FAMILY OF MRS. S.

Her grandmother, mother and brother have suffered from symptoms pointing probably to leukæmia.

*Walter*, æt. 15, clerk in an office, is in poor health, feels languid and dull and is losing flesh. There is slight splenic enlargement.

*Blood:* July 13th, 1887, Red Corp. 3,355,000; W : R = 1 : 200.
Aug. 18th, " " " 3,240,000; W : R = 1 : 275.

*Arthur*, æt. 14, July 13th, " Red Corp. 4,725,000; W : R = 1 : 350.
*Lydia*, æt. 11, July 13th, " " " 4,795,000; W : R = 1 : 350.

*Louisa*, æt. 8, was treated for leukæmia in the Montreal General Hospital, from October 5th to December 12th, 1885. Splenic dullness then extended two inches below the costal margin, and stretched over toward the umbilicus. She is now in poor health, very puffy about the cheeks and eyes, with spleen considerably enlarged both laterally and vertically.

*Blood:* October 12th, 1885, Red Corp. 1,912,000; W : R = 1 : 15.
December 2d, " " " 3,576,000; W : R = 1 : 16.
July 13th, 1887, " " 4,220,000; W : R = 1 : 300.
August 18th, " " " 3,183,000; W : R = 1 : 240.

*Charles*, æt. 6, July 13th, 1887; Red Corp. 4,525,000; W : R = 1 : 350.

*Freddy*, died Dec. 26th, 1885, æt. six months. Was apparently pretty well till the mother's milk failed, a few days before her admission to the Montreal General Hospital (Sept. 15th, 1885). On examination at the hospital he was found to be leukæmic, with enlarged spleen, diminution in red and increase in white cells. Unfortunately, the record of his blood count has been mislaid. He was sent to the Protestant Infants' Home, where he died three months afterward, from abscess. No autopsy was held.

The following tables show the blood counts of Mrs. S. and family, and of the placenta from her last confinement :—

TABLE 1.—MRS. S.—BLOOD COUNT.—AVERAGE OF 3 COUNTS.

| DATE. | RED CELLS. | W : R | REMARKS. |
|---|---|---|---|
| 1885. Sept. 17 | 2,400,000 | 1 : 40 | 3 months after confinement in M. G. H. |
| " 25 | 2,900,000 | 1 : 17 | Left hospital November 2d. |
| Oct. 31 | 2,480,000 | 1 : 12½ | |
| 1886. April 28 | 3,400,000 | 1 : 50 | One month pregnant. |
| May 3 | 2,900,000 | 1 : 45 | |
| Oct. 8 | 1,070,000 | 1 : 10 | |
| " 29 | 990,000 | 1 : 4 | Two hours after delivery. |
| Nov. 1 | 1,100,000 | 1 : 20 | |
| " 9 | 1,900,000 | 1 : 35 | Discharged from Maternity Hospital. |
| 1887. July 22 | 1,406,000 | 1 : 20 | Between two and three months pregnant. |
| Aug. 18 | 1,373,090 | 1 : 3 | Between three and four months pregnant. |
| INFANT. | | | |
| 1885. Oct. 29 | 5,210,000 | 1 : 175 | Two hours after birth. |
| Nov. 1 | 5,000,000 | 1 : 150 | |
| PLACENTA. | | | |
| 1886. Oct. 29 Pl. Vein. | Trunk—4,610,000 | 1 : 173 | Eighteen hours after expulsion. |
| | Branch—4,600,000 | 1 : 128 | |
| Pl. Artery. | 5,410,000 | 1 : 270 | |
| Pl. Sinuses. | 950,000 | 1 : 3.6 | |

TABLE 2.—MRS. S.'s CHILDREN—BLOOD COUNT—AVERAGE OF 3 COUNTS.

WALTER, AGED 15, CLERK, IN POOR HEALTH.

| DATE. | RED CELLS. | W : R | REMARKS. |
|---|---|---|---|
| 1887. July 13 | 3,355,000 | 1 : 200 | |
| Aug. 18 | 3,240,000 | 1 : 200 | |

ARTHUR, AGED 14.

| DATE. | RED CELLS. | W : R | REMARKS. |
|---|---|---|---|
| 1887. July 13 | 4,725,000 | 1 : 350 | |

LYDIA, AGED 11.

| | | | |
|---|---|---|---|
| 1887. July 13 | 4,795,000 | 1 : 350 | |

LOUISA, AGED 8.

| | | | |
|---|---|---|---|
| 1885. Oct. 12 | 1,912,000 | 1 : 15 | Was in M. G. H. Oct. 5th to Dec. 12th, 1885, with Leukæmia. Spleen enlarged. Vide report. |
| Dec. 2 | 3,576,000 | 1 : 16 | |
| 1887. July 13 | 4,220,000 | 1 : 300 | |
| Aug. 18 | 3,183,000 | 1 : 240 | In failing health at last examination. |

CHARLES, AGED 6.

| | | | |
|---|---|---|---|
| 1887. July 13 | 4,525,000 | 1 : 350 | |

FREDDY, DIED, AGED 6 MONTHS.

Mother nursed him till about three months old, when milk failed, and she entered M. G. H., Sept. 15th, 1885, for Leukæmia. Child was then examined and found to be leukæmic, with enlarged spleen; diminution of red and increase of white cells; blood count has been mislaid. Sent to Infants' Home, where he died Dec. 25th, 1885. No post-mortem.

The points of interest in this case seem to be—

1. *The family history:* The grandmother, mother and brother of the patient have suffered from symptoms probably pointing to leukæmia. Two of her own children have had well-marked leukæmia, another is now in ill health, with diminished red cells and enlarged spleen. None of her children reach the standard of 5,000,000 red corpuscles to cmm., and all have suffered from attacks of jaundice. Has leukæmia in this case showed a tendency to heredity?

2. *Splenic tumor* was first noticed by her at the *beginning* of her sixth pregnancy.

3. *Spleen and liver* always enlarge during pregnancy and become tender.

4. The progressively *enormous increase of white* cells and *decrease of red* cells, as pregnancy advances.

5. *Absence of uterine hemorrhage* during labor and the puerperal period; the labor was dry and bloodless, and the lochial discharge untinged with red.

6. The rapid *subsidence of œdema and dyspnœa* after the termination of labor, together with the rapid increase of red and decrease of white cells.

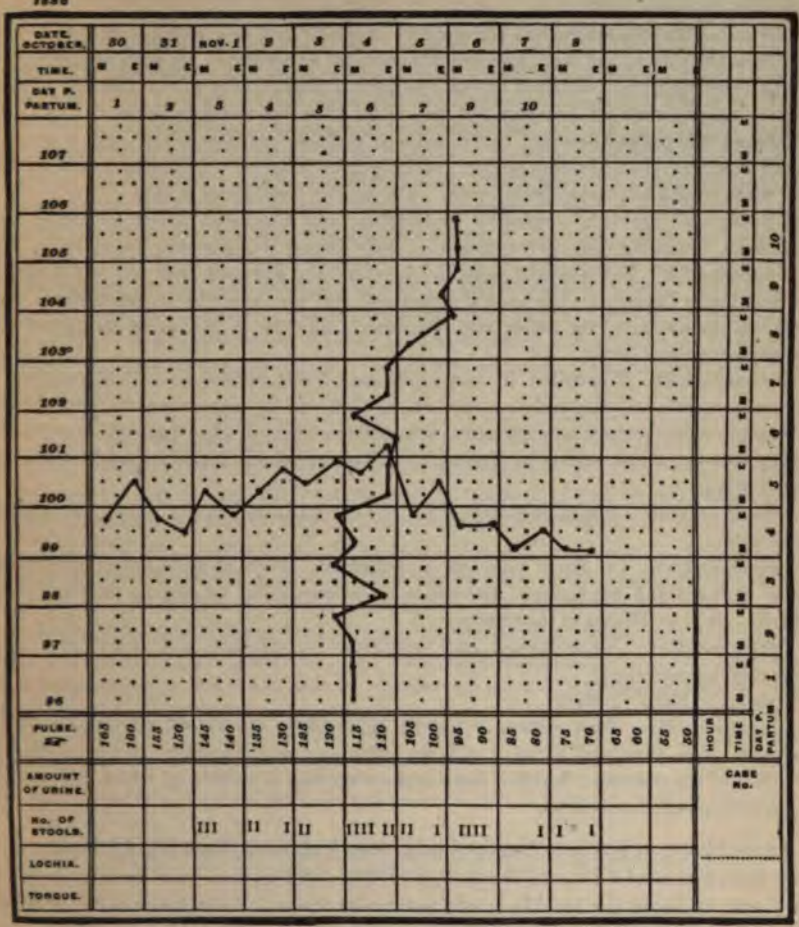
7. The extent of recovery, so as to be able to do household work, and the remarkable chronic course of the disease.

8. *Recurrence of pregnancy*, now the third time since splenic enlargement was first noticed.

9. The remarkable difference between the blood of the mother and child, and the difference in the blood of the placental artery, vein and sinuses. There were more red corpuscles in the artery than the vein, showing that the child made red blood in its body.

10. The disastrous effect of nursing upon the child, causing purpura, vomiting, purging and death.

MRS. S., VII-PARA. RECORD OF TEMPERATURE AND PULSE DURING THE PUERPERAL PERIOD.




Abbreviations—F. Free. M. Moderate. S. Scanty. R. Red. Pk. Pink. Br. Brown. P. Pale. O. Offensive.
Prefix.—V. Very. Sl. Slightly.

## DISCUSSION.

Professor CHAS. WARRINGTON EARLE, Chicago, said :—

I can say nothing of splenic leukæmia, associated with enlargement of that organ, but the general condition of Prof. Cameron's patient is so similar to that of two patients who were under my care, with what I have called pancreatic anæmia, that it seems a history of them should be related in this discussion.

CASE I.—Patient under the care of Dr. Joseph Haven, who called me in consultation and kindly furnished notes.

Was called to see Mrs. R., November 18th, 1883, to relieve, if possible, the nausea and vomiting of pregnancy. She is American by birth, of nervous temperament, aged thirty-six years, and has been married thirteen years. She has had two children, both of whom are living, and eight years ago one miscarriage, which was followed by some

uterine disease. Apart from this she has always enjoyed comparatively good health. Three months ago menstruation ceased, and shortly after nausea and vomiting followed, for which she seeks relief.

She states that six weeks ago her appetite began to fail, and she has gradually lost flesh from that time, but aside from nausea, she has experienced no pain or inconvenience of any kind; and inasmuch as she has always become very much reduced during previous pregnancies, she has paid but very little attention to this symptom.

I found the patient anæmic, much reduced in flesh, muscles flabby, and a general lack of vitality. Temperature normal, and physical examination elicited nothing aside from what would be caused by anæmia. The bowels were constipated.

I prescribed antacids, a laxative at bedtime, and a general course of tonics and stimulants, including iron, hypophosphites, cod-liver oil, kumyss and sherry wine.

November 23d. Her husband called as directed, and reported that his wife's condition was much improved; the nausea is relieved and the appetite is improving. She is ordered to continue the tonics and stimulants, and he is requested to report any change that should occur.

December 13th. Was called in the night and found patient in critical condition; extremely emaciated, respiration slow and labored, radial pulse scarcely perceptible, extremities cold, breath very offensive, articulation difficult (due in part to aphthæ), heavily-coated tongue, sordes on the teeth. Husband states that she had been failing several days.

December 15th. Slight improvement. Has revived somewhat under the use of stimulants.

December 15th. Dr. Earle called in consultation. Find no symptoms, other than that of anæmia and prostration, and suggest the possibility of obscure internal complication, such as disease of the pancreas.

December 16th. Nourishment and stimulant by stomach and bowel give only temporary improvement.

December 17th. Death.

December 18th. Post-mortem. Uterus enlarged to the extent of three months' pregnancy and contained fœtus. All the other organs apparently normal, with the exception of the pancreas, which is hard and contracted, a portion of which is removed for microscopical examination.

In the history of this case from beginning to end, there has been a lack of symptoms other than a general failing of the powers of life. There has been no pain or other symptoms, to locate the trouble in any particular organ. An analysis of urine failed to establish renal complications. It is to be regretted that the character of the fecal dejections could not be investigated as to the presence of fat. There is no family history of carcinoma, constitutional or wasting disease.

The microscopical changes in the pancreas are described, and kindly furnished by Prof. Marie J. Mergler:—

"On microscopical examination the entire organ is found more or less altered. In some portions, the connective tissue between the acini is increased, and many of the gland cells have undergone fatty degeneration; in others the broad bands of connective tissue encroach considerably upon the glands, and in place of their large polyhedral cells are found small, irregular shriveled bodies, evidently atrophied gland cells; and still other sections do not even present a trace of gland structure; they consist entirely of connective tissue."

CASE II.—This patient was a lady twenty-one years of age, born in New York, and married during the early part of 1882. At that time she was robust, healthy, and had

never experienced any sickness whatever. She gave birth to a child in May, 1883, and made an excellent convalescence. During her pregnancy she had the care of a consumptive husband, who died a few days after the birth of his child. The care, attention and anxiety connected with the sickness and death of her husband, in addition to the care which she was bestowing upon her child, made me very solicitous in regard to her health, and I examined her repeatedly for evidence of disease. About two months after the birth of the baby she commenced to cough and emaciate. I suspected disease of the lungs, but a careful examination, repeated time after time, revealed no disease of these organs whatever. At the end of four weeks there was a great improvement in the cough, but at that time an extreme diarrhœa commenced, with considerable pain in the stomach. Those two symptoms troubled her more or less up to the time of her death. She had an extraordinary appetite, but never cared for fatty articles of food. During all these weeks she emaciated rapidly, and every organ accessible, by every means possible, was examined for evidence of disease. During the last four months of her life there was present the whiteness in all the tissues which I had noticed in the first case I have reported, and upon which I based my diagnosis. Death took place March 15th, 1884.

At the autopsy, not an organ of the body was sufficiently impaired to cause any disease, except the pancreas, which was hard and white, and the microscopic examination of which gave us the exact results which we found in the preceding three cases—increased connective tissue and obliteration of the glandular apparatus.

The three symptoms which characterize this peculiar anæmia are great loss of flesh, extreme whiteness of tissues and generally pain in the region of the pancreas.

We have an additional disease to those hitherto recognized, and one remarkable for its duration and degree of exhaustion which precedes death. It is to be regretted that the blood was not examined with the care exhibited in Prof. Cameron's case, but they belong to the same class of disease and should be studied with greater care than we have exercised up to this time.

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## DE L'URÉMIE EXPÉRIMENTALE. SON INFLUENCE SUR LA VITALITÉ DES FŒTUS.

### ON EXPERIMENTAL URÆMIA AND ITS INFLUENCE ON THE VITALITY OF THE FŒTUS.

### ÜBER EXPERIMENTELLE URÄMIE UND IHREN EINFLUSS AUF DAS LEBEN DES FÖTUS.

PAR LE DR. CHARPENTIER, et PAR LE DR. LUCIEN BUTTE,
Professeur agrégé à la Faculté de médecine de Paris; Membre de l'Académie de Médecine. Chef de laboratoire a l'hôpital Saint-Louis.

L'étude des rapports qui existent entre la mère et le fœtus souléve des questions de la plus haute importance, tant au point de vue de la physiologie pure qu'au point de vue de la pathologie et de la thérapeutique. Ces questions, non encore élucidées pour la plupart, méritent au premier chef d'attirer l'attention des expérimentateurs, et en effet, c'est l'expérience presque seule qui nous permettra un jour d'expliquer un grand nombre des problèmes que la clinique n'a fait que poser jusqu'ici.

Parmi ces problèmes, celui dont la solution nous permettra de comprendre les causes de la mort du fœtus dans le sein maternel a surtout attiré notre attention.

Nous avons déjà fait un grand nombre d'expériences dans le but d'élucider cette

importante question et nous croyons dès maintenant l'avoir résolue au moins en partie.

Dans notre travail actuel, nous voulons uniquement nous borner á traiter un seul point de ce vaste sujet, *l'urémie expérimentale* ; c'est-à-dire que nous ne parlerons que de l'influence exercée sur la vitalité du fœtus par l'urée administrée à la mère à doses toxiques.

Le grand rôle que joue, à notre avis, cette substance excrétée dans un grand nombre de phénomènes pathologiques, nous a semblé une raison suffisante pour en faire l'objet d'un travail spécial au point de vue qui nous occupe.

On sait que la plupart des physiologistes se refusent à considérer l'urée comme une substance toxique, et si quelques-uns, comme M. le professeur Bouchard,* veulent bien lui attribuer un rôle dans la pathogénie de l'urémie, ce rôle est tout-à-fait secondaire et accessoire. Cependant il résulte des travaux récents de MM. Gréhant et Quinquaud que l'urée est une substance possédant des propriétés toxiques assez énergiques ; mais il faut pour qu'elles se manifestent, que la dose employée soit suffisante pour imprégner les tissus. Lorsque cette condition est réalisée, la mort survient presque toujours, aussi bien chez les animaux auxquels on injecte de l'urée sous la peau ou dans le sang, que chez les malades atteints d'insuffisance rénale, et cette dernière proposition a été rendue bien évidente par les nombreuses analyses faites par l'un de nous sur la demande du Docteur Quinqaud, analyses qui ont démontré que la vie n'était pas compatible avec la présence dans le sang, et par suite dans les tissus, d'une quantité d'urée huit ou dix fois plus grande quà'la l'état normal,†

Cette toxicité de l'urée étant admise, nous avions á rechercher si cette substance avait une action sur la vitalité du fœtus, et, dans l'affirmative, nous devions nous demander si la mort du fœtus devait être attribuée à son intoxication directe par cette substance, ou bien à des modifications du sang de la mère, modifications telles que la vie du fœtus fût incompatible avec elles.

Parmi ces modifications deux surtout nous paraissent devoir jouer un rôle important dans les causes de la mort du fœtus. En premier lieu, nous citerons la diminution de l'oxygène contenu dans le sang maternel. En effet, à notre avis, la fonction capitale de l'embryon est sa respiration ; c'est grâce à elle que le sang chargé d'oxygène apporté par les veines ombilicales va contribuer à favoriser les oxydations organiques nécessaires à la conservation de la vie.

Lorsque cette fonction est troublée, le fœtus devient malade ; et si l'apport d'oxygène devient insuffisant, il doit succomber rapidement.

Des expériences nombreuses et variées, que nous n'avons pas encore publiées, nous permettent d'affirmer que, lorsque par des artifices expérimentaux, on arrive à faire diminuer progressivement la quantité d'oxygène contenue dans le sang maternel, les fœtus succombent toujours avant la mère.

A côté de cette cause de la mort de l'embryon, nous citerons celle sur la quelle a insisté Runge, c'est-à-dire l'abaissement de la pression artérielle. Pour cet auteur, lorsqu'elle est brusque et notable, cette modification de la circulation est une des causes les plus habituelles de la mort de l'embryon. A l'appui de son dire, Runge cite des expériences de diminution de la pression artérielle causée par des sections de la moelle, des chloroformisations et des éthérisations intenses, dans lesquelles le fœtus a succombé avant la mère. L'opinion de l'auteur allemand qui considère l'abaissement de la pression sanguine maternelle comme un facteur constamment mortel pour l'embryon

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* Bouchard. *Leçons sur les auto-intoxications.* Paris, 1886.

† Gréhant et Quinquaud. Thèse de Meige, 1885. *Recherches sur les variations.* L'urée est un poison. De *l'urée et de différentes maladies. Journal de l'anat. et de la physiol.*, 1884.

est certainement discutable, nous nous réservons d'en faire la critique dans un autre travail ; cependant le fait existe, et nous en avons tenu compte dans ce travail.

Il est évident qu'ils existe d'autres causes de la mort du fœtus, les unes encore inconnues, les autres que la nature même de notre étude nous permet d'éliminer : telles sont la transmission d'un virus à l'embryon, les influences extérieures, les maladies du placenta, etc. Mais nous nous sommes mis à l'abri de ces causes, et nous nous bornerons à rechercher si dans l'intoxication de la mère par l'urée la mort des fœtus a pu trouver sa cause, soit dans la diminution de l'oxygène du sang maternel, soit dans l'abaissement de la pression artérielle. Dans la négative, il nous faudra bien chercher une autre cause, et nous croyons y être arrivés.

Pour résoudre ces différents problèmes, nous avons fait un assez grand nombre d'expériences ; dans les unes, nous avons injecté dans le sang de la mère des doses d'urée rapidement mortelles ; dans les autres, nous avons essayé de produire des intoxications lentes, en injectant sous la peau pendant huit à dix jours des doses quotidiennes d'urée, variant de 2 à 4 grammes. Nous avons suivi la marche de l'intoxication, nous avons pris la pression artérielle, nous avons analysé les gaz du sang de la mère, et nous avons dosé avec le plus grand soin l'urée comparativement dans la masse des tissus fœtaux, d'une part, et dans le sang et les tissus maternels, d'autre part.

Toutes nos expériences ont été faites sur des lapines pleines. La courte période de leur gestation, le poids relativement assez élevé de ces animaux rendent les recherches moins difficiles qu'avec les cobayes par exemple, qui sont beaucoup plus petits, et dont la période de gestation est plus longue.

Les considérations préliminaires une fois établies, il ne nous reste plus qu'à exposer les résultats de nos recherches expérimentales ; mais auparavant il nous faut donner quelques chiffres indispensables obtenus en dosant l'urée dans le sang des lapins, dans leurs muscles, et dans la masse des tissus fœtaux *à l'état normal.*

La connaissance de ces chiffres est absolument nécessaire, si l'on veut les comparer avec ceux que nous avons obtenus à la suite des intoxications.

*Urée contenue à l'état normal dans* 100 *grammes de substance.*

| | 1er expérience. | 2e expérience. | 3e expérience. |
|---|---|---|---|
| Sang artériel de la mère | 0.019 | 0.023 | 0.020 |
| Muscles de la mère | | 0.031 | 0.029 |
| Masse des tissus fœtaux | 0.013 | 0.010 | 0.011 |

### INTOXICATIONS AIGUËS PAR L'URÉE. MORT DES FŒTAUX AVANT MÈRE.

Dans une première série d'expériences nous avons intoxiqué la mère, à l'aide d'injections de solutions d'urée poussées lentement dans le bout central d'une des veines jugulaires externes. La dose injectée a toujours été de trois grammes pa kilogramme d'animal ; enfin la solution dont nous nous sommes servi était à moitié, c'est-a-dire que deux centimètres cubes de solution correspondaient à un gramme d'urée.

Dans ces conditions bien déterminées, les expériences assez nombreuses que nous avons faites, nous ont toujours permis de constater la mort des fœtus avant celle de la mère.

Voici le résumé de quelques-unes de ces expériences,

### EXPÉRIENCE I.

À une lapine pleine de vingt-cinq jours environ, dont le poids est de 3 kilogr. 600 et dont la température rectale est à 39°, 3, on fait, par la veine jugulaire gauche, une injection de 10 gr. 60 d'urée en solution dans 22 cent. c. Cette injection commencée à 9 heures 45 est terminée à 9 heures 53.

À 10 heures 45, la lapine, qui n'avait rien présenté d'anormal jusque là commence à s'affaiblir.

11 heures 25.—T. R. 37°, 4 ; les mouvements sont bien moins vigoureux, la respiration est peu profonde.

11 heures 30.—L'affaiblissement est extrême, légers mouvements convulsifs des extrémités, l'animal reste étalé.

On ouvre l'abdomen à ce moment et on trouve dans l'utérus sept fœtus morts dont le cœur ne bat plus, et qui sont absolument inertes. (Aucun mouvement spontané ni provoqué par l'exposition á l'air froid ou par le pincement.)

11 heures 37.—La mère meurt, c'est-à dire 1 h. ½ après l'injection.

Le dosage de l'urée, pratiqué dans le sang et les muscles de la mère et dans la masse des tissus fœtaux recueillis au moment de la mort, nous donne :—

| | | |
|---|---|---|
| Urée pour 100 gr. de | sang | 0.098 |
| " " | muscles | 0.056 |
| " " | fœtus | 0.042 |

Cette expérience nous montre que déjà 1 heure 40 après l'injection, l'urée se trouve en excès dans les tissus de fœtus. Le chiffre 0,42 pour cent représente en effet une quantité trois fois plus grande que celle qu'on trouve à l'état normal. Mais cette acumulation assez rapide nous permet-elle d'expliquer la mort du fœtus? N'est-ce pas plutôt dans les modifications du sang maternel ou de la circulation qu'il faut en rechercher les causes? l'expérience suivante va nous répondre.

### EXPÉRIENCE II.

On prend une lapine presqu'à terme pesant 3 kg. 750. Sa pression artérielle prise dans la carotide est égale à 11 cm. de mercure, l'analyse des gaz du sang artériel donne : $CO^2 = 29$ cc. 2 pour cent = 14 cc. pour cent dans la jugulaire.

A 2 h., 45 on injecte 11 gr. 25 d'urée en solution dans 22 cc. 50. L'opération dure 8 min.

A 4 h., 1 heure 15 m. après le début de l'injection, la lapine respire bien ; sa pression artérielle correspond à 10 cen. 4 de mercure ; 100 grammes de sang artériel contiennent : $CO^2 = 27$ cc. 6 $O \times = 13$ cc. 1.

A ce moment on ouvre l'abdomen, la mère étant plongée dans un bain salé à pour cent et à une température de 38° et on trouve dans l'utérus un fœtus unique ; en état de mort absolue, dont le cœur ne bat plus, et qui ne réagit pas sous l'influence des excitations les plus vives.

Ce fœtus qui pèse 27 grammes est traité par le dosage de l'urée, et nous donne pour 100 gr.—0.035 d'urée.

La mère succombe à 4 h. 40, c'est-à-dire 1 h. 55 aprés l'injection.

Dans ce cas nous voyons que ni la pression artérielle de la mère ni les gaz de son sang n'ont subi de modifications suffisamment nettes pour qu'on puisse leur attribuer une part dans la mort du fœtus ; mais l'accumulation d'urée qui, dans cette expérience comme dans la précédente, s'est produite avec rapidité (une heure) dans la masse des tissus fœtaux, doit nous faire songer à une intoxication directe du fœtus.

Quelques expériences d'intoxications lentes que nous allons maintenant résumer vont être bien concluantes à ce point de vue.

*Intoxications lentes pour l'urée.—Mort des fœtus avant la mère.—Accumulation d'urée dans les tissus du fœtus.*

### EXPÉRIENCE III.

Une lapine de 3 kg. 480, dont la température rectale est de 38°, 9 reçoit en 6 jours par injections quotidiennes, une dose totale de 16 grammes d'urée. Elle était pleine de 20 jours environ au début de l'expérience.

Le sixième jour le poids n'est plus que de 3 k. 150, la température rectale est à 41° 9.

La lapine succombe le huitième jour, et l'utérus ouvert au moment de la mort nous laisse voir des fœtus tous macérés morts depuis longtemps déjà.

Dans cette expérience, la mort des fœtus a bien nettement précédé celle de la mère.—Mais à quoi devons-nous attribuer cette mort? Les expériences suivantes vont nous répondre.

EXPÉRIENCE IV.

Sur une lapine pleine de dix huit à vingt jours pesant 3 kilogr. 350 grammes, dont la température rectale est à 39°, 4, on prend la pression artérielle normale, qu'on trouve égale à 11 cent. 8 de mercure; l'analyse des gaz du sang donne, chez cet animal, pour 100 grammes de sang artériel :—

| | |
|---|---|
| $CO^2$ | 30 cc. |
| O | 13 cc. 5. |
| $A^z$ | 2 cc. 1. |

On lui injecte ensuite, pendant une période de sept jours, une quantité d'urée égale à 25 grammes, ce qui fait un peu plus de trois grammes par jour.

Le septième jour le poids de la lapine est de 3 kilogrammes 300 gr.; sa température est montée à 40°, 8. Dans la nuit du septième au huitième jour, elle avorte de deux petits de plus de trois semaines, et qu'on trouve morts dans la cabine le huitième jour dans la matinée. A ce moment la température rectale est de 40°, 95; la pression artérielle, prise dans la carotide, est égale à 11 centimètres 5 de mercure, enfin l'analyse des gaz du sang artériel donne :—

| | |
|---|---|
| $CO^2$ | 21 cc. 4. |
| O | 14 cc. |
| $A^z$ | 1 cc. 9. |

Le dosage de l'urée dans le sang de la mère donne 0 gr. 048 pour 100 grammes.

La masse totale du fœtus contient 0. 043 d'urée pour 100.

On voit que la pression artérielle ne peut entrer en ligne de compte parmi les causes de la mort du fœtus, puisqu'elle est à peine modifiée : 11 cc., à l'état normal, 11 cc., 5 peu après la mort des fœtus.

La légère diminution d'oxygène constatée (13 cc., 5 — 11 cc. — 2 cc., Or en moins dans le sang artériel) ne nous semble pas non plus devoir être considérée comme un facteur important, car elle est trop minime.

Nous ne parlerons pas non plus de l'hyperthermie de la mère (40°95), qui depuis les travaux de Doléris et Doré, faits sous l'inspiration de M. Charpentier, ceux plus récents de Prayer et Runge, doit être considérée comme exerçant une influence nulle sur la vitalité du fœtus.

Reste donc comme cause déterminante probable de la mort du fœtus, l'intoxication de celui-ci par l'urée. L'excès de cette substance que nous avons trouvée en quantité trois fois plus grande qu'à l'état normal dans les tissus du fœtus, nous fait pencher en faveur de cette dernière opinion.

L'expérience suivante qui a duré plus longtemps et dans laquelle nous avons trouvé une bien plus grande accumulation d'urée dans la masse des fœtus est encore plus concluante.

EXPÉRIENCE V.

Pendant 10 jours on inject à une lapine pleine de 15 jours environ et dont la température rectale est à 39°,8, une dose quotidienne de 2 à 4 grammes d'urée, soit en tout 25 grammes.

L'avant-dernier jour, la température rectale est montée à 40°,6, le poids est descendu à 2 kilog. 800, la patte antérieur gauche est paralysée, les réflexes sont exagérés.

Le dixième jour l'animal est très malade, étendu sans mouvement, respirant à

peine. On ouvre immédiatement l'abdomen, et on en retire neuf fœtus, tous morts depuis un certain temps ; ils sont macérés, leur surface est rouge, leur foie est jaunâtre, extrêmement friable ; il n'y a presque pas de liquide amniotique.

L'autopsie de la mère montre que les viscères sont congestionnés pour la plupart : le poumon gauche est en partie splénisé.

Le dosage de l'urée dans le sang de la mère nous donne 0 gr. 076 pour 100 grammes de sang.

Le dosage de la même substance dans la masse des tissus de trois fœtus pesant ensemble 43 grammes, nous donne pour 100 grammes 0 gr., 086, chiffre supérieur à celui trouvé dans le sang de la mère.

La quantité d'urée trouvée dans les muscles de la mère est de beaucoup inférieure à celle contenue dans la masse totale du fœtus, et nous n'en trouvons que 0 gr., 054 pour 100 grammes du tissu musculaire.

Insistons sur cette grande accumulation d'urée dans les tissus fœtaux, et faisons remarquer que, tandis que le sang de la mère contient 0.076 pour cent d'urée, que ses muscles en renferment 0.054 pour cent, la masse des tissus des fœtus nous en fournit 0 gr. 086 pour le même poids. Les fœtus ont donc emmagasiné plus d'urée que la mère, ils en sont saturés, et sans doute leur mort doit être attribuée à une véritable intoxication par cette substance.

La mère résiste plus longtemps que les fœtus, voilà le fait ; l'explication peut se trouver. En effet la mère, au fur et à mesure qu'elle reçoit son urée, l'élimine, au moins en partie par ses reins ; le fœtus, lui, qui, puisque les injections à la mère sont quotidiennes, se trouve constamment en rapport avec un sang placentaire toujours très riche en urée, absorbe toujours et élimine peu. Il en résulte que la substance toxique s'accumule chez le fœtus en plus grande proportion que chez la mère et comme il est peut-être moins résistant que celle-ci à l'action de l'urée, il succombe avant elle. Quoi qu'il en soit de cette explication, dans les intoxications chroniques comme dans les intoxications aiguës par l'urée, le fait est indéniable, les fœtus succombent avant la mère, et l'on trouve dans leurs tissus une accumulation d'urée plus grande parfois que celle qui se produit chez la mère.

Le tableau suivant donne le résumé de nos expériences en ce qui concerne les dosages de l'urée dans le sang, et les tissus de la mère ainsi que dans la masse du fœtus.

URÉE CONTENUE DANS 100 GRAMMES DE :—

| | Sang de la mère à l'état normal. | Sang de la mère après intoxication. | Muscles de la mère. | | Fœtus. | |
|---|---|---|---|---|---|---|
| | | | A l'état normal. | Après intoxication. | A l'état normal. | Après intoxication. |
| 1er exemp. d'intoxication aigüe | | 0.098 | | 0.056 | | 0.042 |
| 2 " " | | | | | | 0.035 |
| 1e exemp. d'intoxication lente | 0.020 (moyenne) | 0.048 | 0.030 (moyenne) | | 0.012 (moyenne) | 0.043 |
| 2e " " | | 0.076 | | 0.054 | | 0.086 |

Concluons maintenant que dans les cas d'urémie expérimentale obtenue chez le lapin, soit en injectant directement dans le sang des doses massives d'urée, soit en

introduisant sous la peau des doses quotidiennes, la mort des fœtus se produit avant celle de la mère.

La cause de cette mort rapide des fœtus ne peut être expliquée par un abaissement de la pression sanguine de la mère, qui, d'après Runge serait un des facteurs les plus importants de la mort des fœtus ; cette pression sanguine ne subit pas en effet de modifications au moment de la mort des fœtus.

La diminution de la quantité d'oxygène contenue dans le sang maternel, qui, d'après nos recherches, est également une des causes déterminantes de la mort des fœtus, ne peut non plus entrer en ligne de compte, puisque cette diminution est très minime lorsqu'elle existe.

Il nous reste donc, comme une des explications les plus plausibles, à attribuer la mort du fœtus à une intoxication directe par l'urée. L'accumulation d'urée que nous avons constatée dans les tissus des fœtus, accumulation produite aussi bien par l'arrivée de la substance dans le sang fœtal, que par l'impossibilité de son élimination, le sang de la mère étant surchargé, est un fait qui nous permet, au moins pour l'instant, d'adopter cette dernière opinion.

La clinique est-elle d'accord avec l'expérimentation ? Le fœtus succombe-t-il presque toujours dans les cas d'insuffisance rénale avec accumulation d'urée dans l'organisme ? Jusqu'ici nous ne connaissons pas d'analyses d'urée dans le sang de femmes enceintes, atteintes de mal de Bright à la période d'état, mais nous savons que très souvent dans les cas de néphrite, on a des fœtus mort-nés.

Dans un tableau dressé par Hoffmeier nous voyons que sur 104 femmes atteintes de néphrite et enceintes, 62 ont mis au monde des enfants morts.

Le dosage de l'urée dans le sang de la mère que nous avons l'intention de pratiquer à l'avenir, toutes les fois que des femmes enceintes atteintes de néphrite se prèsenteront à notre observation, nous donnera de précieux renseignements, et complètera ce travail purement expérimental, et qui par cela même, ne nous permet pas de conclure pratiquement d'une façon absolue.

Mais ces expériences nous autorisent peut-être à élucider un autre point clinique.

Tous les accoucheurs savent que quand les crises d'éclampsie avec albuminurie ne surviennent qu'au début, ou très près du début du travail, on voit très souvent, pour ne pas dire toujours, les enfants naître vivants (accouchement spontané ou forceps), tandis que lorsque l'éclampsie survient à une époque moins avancée de la grossesse, et que ce travail ne se déclare que plus tardivement, les femmes accouchent presque toujours d'enfants morts, et cela au bout d'un temps plus ou moins éloigné de quelques jours á quelques semaines et même plus.

Ne pourrait-on admettre que dans ces cas il ne s'agit pas seulement d'une albuminurie gravidique, mais bien d'une albuminurie déterminée par une lésion rénale avec accumulation d'urée—on pourrait ainsi d'une part expliquer la mort du fœtus, et d'une autre part la persistance prolongée de l'albuminurie que l'on a occasion d'observer chez un certain nombre de femmes dans cette conditions.

Du reste, la question de l'éclampsie est essentiellement complexe, et pour nous en tenir aux résultats de nos expériences, nous sommes en droit d'en conclure, qu'aujourd'hui Claude Bernard n'écrirait probablement plus les phrases suivantes qui se trouvent dans son livre.—*Propriétés physiologiques et altérations pathologiques des liquides de l'organisme.* 2 *N. S.* 36.

"On ne connait à l'urée aucun rôle physiologique. Elle est régulièrement éliminée par le rein. Lorsque cette élimination se trouve gênée, on voit de phénomènes graves survenir, sans qu'il soit actuellement possible de dire si ces phénomènes sont la conséquence directe ou secondaire de l'accumulation de l'urée dans le sang, ou s'ils sont sous la dépendance de la lésion qui a causé cette accumulation."

C'est en 1859 que Claude Bernard s'exprimait ainsi, et vingt-huit ans se sont écoulées

depuis. C'est dans son laboratoire que nos expériences ont été faites, et actuellement, nous croyons au contraire pouvoir conclure à la nature essentiellement toxique de l'urée, et aux dangers qui peuvent résulter pour le fœtus de son accumulation dans les tissus maternels, et dans les siens propres.

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## UNIFORMITY IN OBSTETRICAL NOMENCLATURE.

### UNIFORMITÉ EN NOMENCLATURE OBSTÉTRIQUE.

### ÜBEREINSTIMMUNG IN DER GEBURTSHÜLFLICHEN NOMENKLATUR.

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In accordance with a remit from the Eighth International Medical Congress to the Committee on Uniformity in Obstetrical Nomenclature, I first of all brought the subject under discussion in the Edinburgh Obstetrical Society. As a result, a schedule was drawn up which was sent to the various members of the Committee of the different nationalities. Copies were also sent to all the obstetrical teachers in the United Kingdom of Great Britain and Ireland. At the instance of Prof. King, of Washington, they were sent also to the members of the American Gynæcological Society whose names appear in the volume of their Transactions for 1886. Prof. Stadtfeldt, of Copenhagen, reprinted the schedule, with some modifications, for circulation among his Scandinavian colleagues. Others of the Continental members of the Committee made use of the Edinburgh Obstetrical Society's schedule for the purpose. Some sixty separate papers have been returned to me; and the returns of Professors Halbertsma and Mangiagalli represent respectively the opinions of the Dutch and Italian professors of midwifery, while Dr. Hennig gives the opinions of four of the German professors, and embodies the results of a discussion on the subject by the Leipzig Obstetrical Society.

I beg to submit first the schedule, and then an analysis of the replies and commentaries which have been returned, with the view of finding in them a basis for a full discussion, and haply of a final determination of the subject at this Congress.

The schedule, which I may ask you to note embodies the possibilities agreed to among the Edinburgh teachers of midwifery, along with the other fellows of the Obstetrical Society there, is as follows:—

#### (A) THE RETURNS GENERALLY.

Analyzing the returns we note, first of all, that thirteen accept the scheme in its entirety. Prof. Carl Braun von Fernwald, of Vienna, *e. g.*, declares himself "mit allem einverstanden." Dr. Fancourt Barnes "agrees with it in toto." It has the "entire approbation" of Dr. Busey, of Washington. Dr. William H. Byford, of Chicago, "approves of the idea and the programme in itself." Dr. W. L. Reid, of Glasgow, says: "There is nothing in it with which, after careful consideration, I feel disposed to disagree."

#### (B) THE INITIAL QUERY.

"Do you consider it desirable to try to attain uniformity in obstetrical nomenclature?"

In answer to the initial query, all the returns give an affirmative reply. Many

emphasize it by adding, "Extremely so," "Eminently so," "Certainly," "By all means," "Not only desirable but essential," etc. A few qualify the affirmative: Dr. Playfair, of London, *e. g.*, saying, "Certainly, but it will be difficult;" and Dr. Matthews Duncan, "Yes, but there will be great difficulty in hastening the attainment, from the absence of any kind of authority." Dr. Lawrence, of Bristol, says: "Yes, if the various writers on midwifery can be persuaded not to indulge in fancy terms, but adhere to what is laid down in this paper."

### (C) THE SPHERE OF POSSIBLE ATTAINMENT OF UNIFORMITY.

The next question relates to the possibility of the attainment of uniformity in expression in regard to (I) The Pelvic Diameters; (II) The Diameters of the Fœtal Head; (III) The Presentation of the Fœtus; (IV) The Positions of the Fœtus; (V) The Stages of Labor; (VI) The Factors of Labor, or any other Topics.

To this the majority of the returns simply give an affirmative reply. Some, however, regard certain of the subjects as doubtful or of minor importance. Thus, Dr. Stadtfeldt puts marks of interrogation opposite IV, V and VI. Dr. Collingsworth, of Manchester, says with regard to VI, "doubtless possible, but scarcely of equal importance with Nos. I and V." Dr. Meyer, of Copenhagen, and Dr. Playfair express a like doubtful opinion with regard to VII. Dr. Champneys, of London, thinks "the pelvic and fœtal measurements should be settled," and doubts "if the other matters stand on the same footing, or if general agreement is likely for some time yet." Opposite IV, Dr. More Madden, of Dublin, writes "No."

### (D) THE INDIVIDUAL DEFINITIONS AND DESIGNATIONS.

Coming to the answers to the question, "Are you prepared to adopt the following definitions and designations, or what modification of them would you propose?" we note that Professor Schultze, of Jena, finds the use of abbreviations doubtful. Dr. Playfair says: "I recognize the importance, but I am not prepared to pledge myself to adopt these in future editions of my book, as it would probably involve too great a change. Moreover, I have found the lettering always somewhat confusing." Others remark on the desirability of dropping the initial letter of the word diameter, in naming the pelvic diameters; and with regard to this Dr. Matthews Duncan suggests that the initial of the noun be printed with a small d, while the initials of the adjectives should be capitals. The Dutch, French, Italian, German and Scandinavian returns agree with many of the British and American authorities in asking that Latin terms be employed.

#### I. PELVIC BRIM DIAMETERS.

As regards the pelvis, the scheme suggests definitions and designations only of the internal diameters at the brim. Dr. Engelmann, of St. Louis, in a very thorough-going analysis of the scheme suggests that the external diameters also should be included. In this he is supported by several authorities, such as Dr. Hennig, of Leipzig, who wants, in addition, that the diameters of the large pelvis should be noted. He suggests: "The spinous diameter, running between the inner borders of the anterior superior spine of the ilium—Diameter Spinosa; the cristæ, between the outermost margins of the most distant parts of each crista ilii—Diameter Cristeles, Cr.; and the internal trochanteric—Diameter Trochanterica, Tr." Dr. Herrgott, of Nancy, and Dr. Duchany, of St. Etienne, wish note to be taken of diameters below the brim, as do also the Dutch professors.

The scheme asks for definition and designation of—

1. The antero-posterior diameter, as that which runs "between the middle of the sacral promontory and the point in the upper border of the symphysis pubis composing the linea terminalis—Conjugate Diameter, C. D."

The great majority accept this definition as it stands. Dr. Robert Barnes inclines to think that the real obstetric C. D., *i. e.*, the narrowest diameter, is a little below the upper margin of the symphysis where it bulges. Dr. Galabin, of London, says: "I should prefer to say 'nearest point in the upper border of the symphysis pubis.' How is the linea terminalis defined?" Dr. Champneys, underlining the word *upper*, says: "No. This cannot be measured in the living woman, and it is not the *smallest* diameter." Without, however, suggesting any alternative definition. Dr. Ullman, of Gotheborg, defines as follows: "Antero-posterior, between the middle of the sacral promontory and the point of the upper border of the symphysis pubis."

With regard to the mode of designating this diameter, Prof. Ullmann adds: "As C. D. now means conjugata diagonalis, the proposed change would give rise to a mistake. If a change seems necessary, Diameter Sagittalis (aperturæ superioris pelvis), D. S., would be better." Dr. Duchany, of St. Etienne, wishes mention to be made of the sacro-cotyloid diameter, and is in agreement with Dr. Graily Hewitt and several others in requiring that mention be made of two conjugate diameters, the conjugata vera, C. v., and the conjugata diagonalis, C. d., from the centre of the sacral promontory to the lower margin of the symphysis pubis. Dr. Dumas, of Montpellier, suggests as an alternative designation for the conjugate—antero-posterior, A. P.

The second of the straight diameters at the pelvic brim the scheme proposes to deal with is—

"2. Transverse: between the most distant points in the right and left ileo-pectineal lines—Transverse Diameter, T. D."

Here the only dissentient from the definition is Dr. W. S. A. Griffiths, who says: "This varies in different pelves. I prefer a front or each side midway between the sacro-iliac synchondrosis and the pectineal eminence."

All are agreed as to its designation as transverse, and generally as to the use of the title T.

When we come to the consideration of the diagonal diameters we find a much greater diversity of opinion. The scheme registers them as—

"3. First oblique: between right sacro-iliac synchondrosis and left pectineal eminence = Right Oblique Diameter, R. O. D.; and—

"4. Second Oblique: between left sacro-iliac synchondrosis and right pectineal eminence = Left Oblique Diameter, L. O. D."

Our Italian and French confréres almost unanimously prefer to describe these diameters as running from before backward—from one or other pectineal eminence to the opposite sacro-iliac joint; and to designate them left or right according as they begin at the respective left or right eminence. Not all, however. M. Auvard, of Paris, *e.g.*, makes no objection under this head; and some of the obstetrical writers and teachers who have been accustomed to follow the anterior definition and designation express their willingness to adopt that suggested in the schedule. Dr. E. W. Sawyer, of Chicago, for instance, says: "Yes; but this would be a little strange to me at first, for I have been accustomed to name the oblique diameters from the pectineal eminences. I would willingly, however, adopt this."

In the naming of these diameters a remark of Dr. Cory deserves special note: that the initial O as a symbol for oblique may lead to confusion with its use for occiput in the naming of the fœtal diameters. In Latinizing the designations all who refer to the subject propose to describe the right as the obliqua or diagonalis dextra. Dr. Duchany proposes to name the left *Læva*: all others use the word *Sinistra*. Drs. Champneys, Collingsworth and Griffiths all take exception to the terms "First" and "Second" as applied to these diameters, although it has not been proposed in the schedule to so designate them; and I may be allowed to add that Prof. Tarnier expressed to me in conversation his conviction that the use of these expressions would be very acceptable to his obstetrical compatriots.

II. DIAMETERS OF FŒTAL HEAD.

The first of the fœtal diameters noted and named in the schedule is—

"1. From tip of the occipital bone to the centre of the lower margin of the chin—Occipito-mental, O. M."

The large majority agree with this definition and accept the designation. In the minority we find Dr. Galabin saying, with regard to this and the following definitions: "I think it clearly wrong that occipito-frontal and occipito-mental diameters should not be measured from the same posterior point. Following Budin, I measure both from the posterior fontanelle." Dr. Jewett, Brooklyn, asks: "Will this always give the greatest occipito-mental measurements?" The Scandinavian obstetricians prefer to make the diameter commence at "the most distant point of the vertex." MM. Hergott and Duchany would have the diameter as defined by the Scandinavians given as an additional diameter.

This additional diameter—from the most distant point in the vertex to the tip of the chin—the importance of which has been developed by Professor Budin in his well-known thesis, and to which reference is made in the returns of Dr. Matthews Duncan and others, Professor Hergott proposes to call mento-sus-occipito; Duchany, more briefly, maximum.

The designation of the diameter running from tip of occiput to tip of chin, almost unanimously accepted, is Occipito-mental, O. M. Dr. Engelmann "would prefer to call this Long Diagonal Diameter, L. D."

"2. From occipital protuberance to glabella—Occipito-frontal, O. F."

About this diameter there is greater unanimity, although, as Professor Leishman remarks, "This is one of the points in regard to which there is confusion." Several authorities besides Budin wish the diameter to start from the tip of the occiput instead of at the occipital protuberance, or Inion, as it is called by craniologists.

With regard to the anterior terminus of the diameter, Dr. Braxton Hicks thinks it may be well to define *Glabella*, and Dr. Wright, of Leeds, asks: "Is this term sufficiently well known?" Professor King thinks it "better that this diameter should end higher up between the frontal eminences, *i. e.*, at the centre of the most projecting part of the os frontis," and with him Dr. Herman, of London, agrees and says: "Instead of glabella, I should think a point midway between the frontal eminences would be better." Dr. Auvard would make it end at "the root of the nose."

Dr. Engelmann suggests for this diameter the designation "Straight Diameter." Dr. Jewett proposes as an alternative expression "Greatest occipito-frontal." Otherwise the designation of the schedule is approved.

"3. From a point midway between the occipital protuberance and the foramen magnum to the centre of the anterior fontanelle (*bregma*)—Sub-occipito-bregmatica, S. O. B."

Professors Gusserow and Graily Hewitt "doubt the value of this diameter, owing to the difficulty in insuring precision," and Professor Hennig writes under this paragraph, "Not adopted in Germany." The majority of the schedules returned accept it as it stands. Modifications in the definition are suggested by Dr. Meyer, of Copenhagen, who says with regard to the posterior terminus: "As the foramen magnum is not palpable in the living baby, I think it would be preferable to say: From the union of the neck and the occiput to the centre of the anterior fontanelle." As to the anterior extremity of the diameter, Dr. Champneys finds it "impossible to measure accurately in the living child the centre of the anterior fontanelle, and would prefer to terminate the diameter at "the *posterior* corner." Dr. Matthews Duncan "would define the centre of the anterior fontanelle as the intersection of the prolonged coronal and sagittal sutures." Professor King eliminates the word bregma and would call the diameter Sub-occipito-coronal, as indicative of more precision in its anterior termination. Dr.

Engelmann would call this the "Short Diagonal Diameter, S. D." M. Duchany would use a small s to indicate the initial of sub, s. O. B.

"4. Between the two parietal protuberances—Bi-parietal, Bi. P."

There are very few remarks made on this paragraph. Dr. Cory points out that P. is already used to designate "Posterior," so that here it might be well to use the two initial letters Pa. of the word "parietal." Dr. Engelmann suggests the term "Long Transverse Diameter, L. T."

"5. Between the two lower extremities of the coronal suture—Bi-temporal, Bi. T."

Here also the majority accept the definition and designation. Not always, however, without criticism. Thus, Dr. Champneys says: "I think this is the best, but it is not the largest. The question is part of a larger one, viz.: whether the measures are to be adapted to *dry* or *living* heads. Dr. Swayne, of Bristol, asks: "Would not the 'Inter-auricular' be better?—between the meatus auditorius on each side. This gives the breadth of the base of the skull." Dr. Galabin has "always understood this to be taken as the maximum transverse points on the coronal sutures" and asks: "What is the use of knowing any diameter not a maximum in any plane?" Dr. Sloan, of Glasgow, says: "I call this Coronal, as more strictly accurate than Bi-temporal." Dr. Potter suggests "Bi-mastoid." Dr. Engelmann would use the designation "Short Transverse." Dr. Herrgott points out the absence of the oblique bi-parietal—"smaller than the straight bi-parietal and of immense importance in cases where the head has to pass through a narrow pelvis." M. Duchany would have notice taken of the Trachelo-bregmatic and bi-parietal diameters.

Before proceeding to the determination of the Fœtal Presentations the schedule suggests, in the following paragraph, the desirability of arriving at a common understanding as to the use of certain expressions.

"DEFINITION OF PRESENTING PART: OF OCCIPUT, SINCIPUT AND VERTEX."

"The Presenting Part is the part which is, during labor, bounded by the girdle of resistance or girdle of control. The Occiput is the portion of the head lying behind the posterior fontanelle. The Sinciput is the portion of the head lying in front of the bregma. The Vertex is the portion of the head lying between the fontanelles."

The paragraph as it stands meets with general approval.

As a simpler definition of the Presenting Part, Dr. Matthews Duncan would prefer to call it "the part whose superficial centre is in the axis of the part of the pelvis which it occupies." Prof. King prefers to say "the presenting part is the part which presents at the os uteri, or at the centre of the pelvic canal; or the part touched by the examining finger." Dr. Herman would define it "at the beginning of" labor, instead of "during" labor, and would prefer to speak of it as bounded by the "os uteri," instead of the "girdle of resistance."

The sentence about the Occiput is left untouched. As regards the Sinciput, Dr. Pippingsköld, of Helsingfors, says: "Sinciput were better determined in front of the centre of the anterior fontanelle. This determination even fits for a hydrocephalic fœtus." Dr. Leishman asks: "Is not this word obsolete? Why not say forehead?" And M. Rodriez, of Lyons, has "always considered Sinciput to be a synonym for Vertex, applied especially to its posterior portion." Prof. King wishes the terms Sinciput, Bregma and Vertex abolished; and as to the Vertex, says: "The bi-parietal suture (and its apeous shores) lies between the fontanelles. Would you call this Vertex?" M. Duchany says: "The terms are acceptable, but might easily be replaced by saying 'the head is more or less flexed or extended.'"

"III. PRESENTATION OR LIE OF THE FŒTUS."

This head line of the next subject passes generally without remark. Dr. Matthews Duncan would leave out the words "Presentation or." Dr. Wright questions the

need of the words "or lie." Dr. Leishman also dislikes the words "or lie" and would read "Presentations of the Fœtus, being the relation which it bears to the long axis of the uterus." Under the three sections Dr. Champneys writes: "Surely these are generally accepted and require no approval."

In the schedule the first section runs:—

"I. *Longitudinal.*

"(1) Cephalic, including—
Vertex and its modifications;
Face and its modifications."

Dr. Wallace, of Liverpool, would simply use the expression "Head" without subdivision. Dr. Herman thinks the words "and its modifications" superfluous. For the word "Vertex" Dr. King substitutes "Occiput," because "the occiput and the face are the two ends of the cephalic ovoid."

The second division of the longitudinal presentations is scheduled thus:—

"(2) Pelvic, including—
Breech, Footling, Knees."

Here the Scandinavian obstetricians unanimously strike out "Knees" as unnecessary, Prof. Faye saying: "The fœtus never presents the knees in a longitudinal presentation. The knees may be near the os uteri in a transverse position." Dr. Wallace, of Liverpool, is in agreement with them. Dr. Herman would say "Knee" instead of "Knees." Dr. Heywood Smith, of London, wants the Footling Presentations more clearly defined. Dr. Braxton Hicks would use the word "Foot," others "Feet," for "Footling."

More important it is to observe that M. Budin and some of his confréres prefer to group the pelvic presentations, as—

1st. Complete Breech Presentations (with feet close to nates).

2d. Incomplete " " } nates, knees, feet.

Such a division they regard as more clinically exact. Dr. W. S. A. Griffiths suggests a similar scheme. Dr. A. I. Venn, after accepting the first section of the presentations given in the schedule, proposes to classify the others as follows:—

"(2). Pelvic—Breech.
"(3). Inferior or Terminal:—
1. Arm. 2. Foot. 3. Knee.
"(4). Transverse, including—
The trunk, shoulders and rare presentations."

This, it will be noticed, involves also a change in the list of the presentations which are referred to in the schedule as—

"2. Transverse or Trunk, including SHOULDER or ARM, and other rarer presentations."

In addition to the modification of these two lines suggested by Dr. Venn, we find in the first line Dr. Matthews Duncan substituting "Oblique" for "Transverse or Trunk," and Dr. Wallace adding "or Cross-births." Dr. Sloan deletes the words "or Trunk" in the first line, and replaces "other rarer presentations" with the word "Trunk." Dr. Griffiths would give, as an additional line, "Complex, any with cord or abnormal part, as foot or hand, etc." Prof. Gusserow would discard the back, breast, abdomen and side presentations, while Prof. Hennig and the Leipzig Society abide by them because of their occasional, though rare, occurrence.

The schedule next takes up, in a condensed scheme, the question of the—

IV. POSITIONS OF THE FŒTUS.

| | | |
|---|---|---|
| 1. Left (L.) | Occipito- (O.)<br>Mento- (M.) | Anterior (A.)<br>Posterior (P.) |
| 2. Right (R.) | Sacro- (S.)<br>Acromio- (A.) | Posterior (P.)<br>Anterior (A.)" |

Here Prof. Leishman adds to the head line "Positions of the Fœtus," the words "being the relation which it bears to the abdominal or pelvic walls." Dr. More Madden does "not agree with the nomenclature," and finds the scheme "too complex for any practical purpose."

Then, besides the objections offered by Playfair, Schultze and others to the use of the initial letters, and the repeatedly expressed desire to have the adjectives Latinized, there are some suggestions as to rearrangement of the scheme in whole or in part, or in certain of the designations. Thus, Dr. Galabin says: "If this nomenclature be adopted, I should leave out numbers, otherwise you call it first position of vertex when abdomen looks to right, and first position of face when abdomen looks to left." Prof. Collingsworth thinks "the arrangement adopted by Dr. Galabin preferable to that of the scheme," but says of the latter: "I am prepared to adopt it in my teaching, for the sake of uniformity." Dr. Griffiths gives as an alternative scheme—

"L. Occipito-anterior. L. Fronto-anterior. L. Sacro-anterior."

Dr. Wallace says: "I speak of the occipito-anterior, or occipito-posterior, with reference to the oblique diameters, Right and Left, not 1st and 2d. Dr. Matthews Duncan, following Spiegelberg, "would prefer—

First—Left, Second—Right,

and then add the anterior or posterior as varieties." Dr. Halbertsma, speaking for the Dutch obstetricians, says: "To come to uniformity, it seems better to give up entirely the distinction between 1st, 2d, etc." In others of the returns, also, the desire is expressed that numerals be banished from the designation of the positions. Dr. Griggs gives, as the scheme for vertex presentations—

| | |
|---|---|
| Left occipito-anterior, L. O. A. | Left occipito-posterior, L. O. P. |
| Right occipito-anterior, R. O. A. | Right occipito-posterior, R. O. P. |

Besides the suggestion already referred to, to name face cases from the direction of the forehead rather than of the chin, we have Dr. Herman proposing to insert the term "dorso" instead of "dacro" and "acromio" in the designation, respectively, of pelvic and shoulder positions.

At the word "acromio" Dr. Stadtfelt puts a query. Some others have drawn the pen through it without suggesting an alternative. Dr. Faye says: I think it is better to say "hand" at the right end or to the left side. The position is never exactly anterior or posterior." Dr. Sloan thinks the transverse positions are difficult to define so briefly as by the word acromio. Dr. King says: "The terms 'Left acromio-posterior,' etc., 'Right acromio-posterior,' etc., are confusing, and do not suggest the attitude of the trunk and body. The 'acromion' is the centre of the presenting part, while 'occiput,' 'mentum' and 'sacrum' are the lateral ends of the respective presenting parts. So far from making the nomenclature of the shoulder presentations and positions agree with that of normal presentations, would it not be more desirable to make them disagree, and as widely as possible? You certainly cannot speak of four positions of shoulder, *i. e.*:—

"Shoulder to right acetabulum.

"Shoulder to left acetabulum.

"Shoulder to left sacro-iliac synchondrosis.

"Shoulder to right sacro-iliac synchondrosis.

"Hence the arrangement must be different. I prefer the following :—

| PRESENTATIONS. | POSITIONS. |
|---|---|
| *Right* Shoulder | Dorso-anterior.<br>Dorso-posterior. |
| *Left* Shoulder | Dorso-anterior.<br>Dorso-posterior." |

Dr. Cory points out the confusion that may arise from the use of the initial A to denote both anterior and acromio.

The fifth subject suggested by the schedule runs as follows :—

### V. STAGES OF LABOR.

Labor to be divided into three stages :—

"1. First Stage. From the commencement of effective pains till complete dilatation of os externum—Stage of Dilatation.

"2. Second Stage. From dilatation of external os till complete extrusion of child—Stage of Expulsion.

"3. Third Stage. From expulsion of child till the complete extrusion of placenta and membranes—Stage of the Afterbirth."

The great majority of the returns agree with the general divisions as well as with the several definitions and denominations of the scheme ; but in regard to each we find diverse opinions expressed. M. Herrgott, *e. g.*, says : "The division of labor into three stages seems to me less desirable than that into five, adopted by Naegle. By preserving" he adds, "the period of *Descent*, which is of such importance in difficult labors, you direct attention to the series of phenomena then taking place." Dr. Heywood Smith asks, "Is not the division into 1st, 2d and 3d stages sufficiently clearly defined and understood by all, except, perhaps, the 3d stage? Some practitioners call hemorrhage during the 3d stage 'post-partum hemorrhage,' which is not correct ; it should be limited to hemorrhage *after* the 3d stage."

As to the naming of the stages in general, Dr. More Madden says : "The terms 1st, 2d and 3d stage are shorter, and convey (as generally understood) the same meaning."

With regard to the first two stages, Dr. Lawrence makes the general remark : "As good as any definition, but I consider it impossible to be exact in these stages." Under the First Stage, Dr. Champneys writes : "There is a true stage before this ;" and after suggesting a change in the definition, Dr. Matthews Duncan notes "Preliminary is omitted here, *i. e.*, from opening up of internal os to beginning of first stage."

This stage Dr. Duncan would define : "From the commencement generally of opening of external os and of felt pains till complete dilatation of os externum." Dr. Potter substitutes the word "regular" for "effective" in this schedule. For "complete dilatation" Dr. Graily Hewitt substitutes "complete dilatation or dilatability" stating that "the object of the alteration is to cover those cases where the fœtal head or other presenting part does not engage in the os (as in brim contraction cases) and yet the os may be *easily* dilatable."

As to the designation of this stage, Prof. Budin asks if it might not be called the "Stage of Effacement and Dilatation." Dr. Matthews Duncan would name it "Stage of Preparation." Dr. Venn proposes the designation "Dilatation Stage."

2. In the second paragraph Dr. Matthews Duncan interpolates "Complete" before "dilatation", the definition of the second stage. Dr. Venn proposes to name it "Expulsion Stage."

3. To the definition of the third stage, Dr. King adds the words "and safe contraction of the uterus." And Dr. Duncan notes that there is "another stage of deliverance from third stage to complete retraction of uterus." This stage Dr. Venn would call "Placental Stage."

The last stage in the schedule runs thus :—

VI. FACTORS OF LABOR.

"1. Powers. 2. Passages. 3. Passenger."

The doubts expressed in regard to the value of this subject under the general head of "The sphere of possible attainment of uniformity" are usually repeated here and sometimes expanded. Thus, Dr. Chillingworth says: "I think the classification admirably adapted to impress important facts on the minds of the students, but should scarcely regard it as one with regard to which uniformity is particularly desirable." And Dr. Wright says: "I have this division in my lectures, but doubt its universal utility." Prof. Leishman also asks: "Is it right to call the Passages and Passenger factors of labor?"

Still, the large majority of the returns accept these divisions, and there are some suggestions for changes in the designations. Dr. Herman and Prof. King would name the second factor "Passage"—singular instead of plural. Drs. Pippingsköld, Graily Hewitt, Heywood, Smith and Grigg are doubtful as to the desirability of calling the third factor "Passenger." Dr. Grigg suggests the use of the three terms "Forces," "Tracts," "Fœtus." Dr. Wallace uses the terms "Uterine and Accessory Powers," "Maternal Passages or Pelvic Canal" and "Fœtus." Dr. E. W. Sawyer proposes the following expansion of the scheme :—

"1. Powers.—Inherent contractility of uterus, reinforced by diaphragm, muscles of the abdominal parietes, and by the muscles of the outlet of the canal.

"2. Passages.—Parturient canal; from the fundus of the uterus to the vaginal ostium.

"3. Passengers.—Fœtus, placenta and membranes."

Such is the summary of the results of the efforts of the Committee to obtain the opinions of obstetricians of different nationalities and schools, as to uniformity in obstetrical nomenclature. It would, no doubt, have been desirable to have issued a new programme to the various members of the Committee, drawn up from answers to the schedule before us. But, as Prof. Stadtfeldt remarks, in sending me the Scandinavian returns, "It is difficult to gather many heads beneath one hat." Indeed, some of the returns only came to hand the week before I left Scotland, and one of them only two days before I set sail.

Perhaps the best thing I can now do is to present to you a series of propositions, founded on the schedule and the returns :—

A. It is desirable to try to attain to uniformity in obstetrical nomenclature.

B. It is possible to arrive at uniformity of expression in regard to—

I. The Pelvic Diameters.
II. The Diameters of the Fœtal Head.
III. The Presentations of the Fœtus.
IV. The Positions of the Fœtus.
V. The Stages of Labor.
VI. The Factors of Labor.

C. The following definitions and designations are worthy of general adoption by obstetrical teachers and authors :—

I. PELVIC BRIM DIAMETERS.

1. Antero-posterior: Between the middle of the sacral promontory and the point in the upper border of the symphysis pubis crossed by the linea terminalis = Diameter Conjugata vera, Cv.

Second: Between the middle of the promontory of the sacrum and the lower border of the symphysis pubis = Diameter Conjugata Diagonalis, Cd.

2. Transverse: Between the most distant points in the right and left ilio-pectineal lines = Diameter Transversa, T.

3. First oblique: Between right sacro-iliac synchondrosis and left pectineal eminence = Diameter Diagonalis Dextra, D. D.

4. Second oblique: Between left sacro-iliac synchondrosis and right pectineal eminence = Diameter Diagonalis Læva, D. L.

### II. FŒTAL HEAD DIAMETERS.

1. From the tip of the occipital bone to the centre of the lower margin of the chin = Diameter Occipito Mentalis, O. M.

2. From the occipital protuberance to the root of the nose = Diameter Occipito Frontalis, O. F.

3. From the point of union of the neck and occiput to the point of intersection of the prolonged coronal and sagittal sutures in the anterior fontanelle = Diameter sub-Occipito Bregmatica, s. O. B.

4. Between the two parietal protuberances = Diameter Bi-Parietalis, Bi-P.

5. Between the two lower extremities of the coronal suture = Diameter Bi-Temporalis, Bi-T.

### III. PRESENTATION OR LIE OF THE FŒTUS.

The Presenting Part is the part which is touched by the finger through the vaginal canal, or which, during labor, is bounded by the girdle of resistance.

The Occiput is the portion of the head lying behind the posterior fontanelle.

The Sinciput is the portion of the head lying in front of the bregma (anterior fontanelle).

The Vertex is the portion of the head lying between the fontanelles.

Three groups of presentations are to be recognized, two of which have the long axis of the fœtus in correspondence with the long axis of the uterus; while in the third the long axis of the fœtus is more oblique, or transverse to the uterine axis.

1. Longitudinal.—
   (1) Cephalic, including—
      Vertex and its modifications.
      Face and its modifications.
   (2) Pelvic, including—
      Breech. Feet.
2. Transverse or Trunk, including—
   Shoulder or arm, and other rarer presentations.

### IV. POSITIONS OF THE FŒTUS.

The positions of the fœtus are best named topographically, according as the denominator looks, *first*, to the left on the right side, and *second*, anteriorly or posteriorly.

In the case of Vertex Positions we have:—

Left Occipito-Anterior..... = Occipito-Læva-Anterior, O. L. A.
Left Occipito-Posterior..... = Occipito-Læva-Posterior, O. L. P.
Right Occipito-Posterior... = Occipito-Dextra-Posterior, O. D. P.
Right Occipito-Anterior... = Occipito-Dextra-Anterior, O. D. A.

The Face Positions are:—

Right Mento-Posterior..... = Mento-Dextra-Posterior, M. D. P.
Right Mento-Anterior..... = Mento-Dextra-Anterior, M. D. A.
Left Mento-Anterior..... = Mento-Læva-Anterior, M. L. A.
Left Mento-Posterior..... = Mento-Læva-Posterior, M. L. P.

The Pelvic Positions are :—

Left Sacro-Anterior..... = Sacro-Læva-Anterior, S. L. A.
Left Sacro-Posterior..... = Sacro-Læva-Posterior, S. L. P.
Right Sacro-Posterior..... = Sacro-Dextra-Posterior, S. D. P.
Right Sacro-Anterior..... = Sacro-Dextra-Anterior, S. D. A.

The Shoulder Presentations are :—

Left Scapula-Anterior ..... = Scapula-Læva-Anterior, Sc. L. A.
Left Scapula-Posterior..... = Scapula-Læva-Posterior, Sc. L. P.
Right Scapula-Posterior... = Scapula-Dextra-Posterior, Sc. D. P.
Right Scapula-Anterior..... = Scapula-Dextra-Anterior, Sc. D. A.

### V. THE STAGES OF LABOR.

Labor is divisible into three stages :—

1. First Stage : From the commencement of regular pains till complete dilatation of the os externum—Stage of Effacement and Dilatation.

2. Second Stage : From dilatation of os externum till complete extrusion of child —Stage of Expulsion.

3. Third Stage : From expulsion of child till the complete extrusion of placenta and membranes—Stage of the After-birth.

### VI. THE FACTORS OF LABOR ARE—

1. The Powers. 2. The Passages. 3. The Passengers.

After some discussion the following motion was made :—

A committee, consisting of the President of the Section, Professor A. F. A. King, Professor W. T. Lusk and Professor A. R. Simpson, shall consider the report of the Committee on Uniformity in Obstetrical Nomenclature, with reference to acceptance and adoption, and shall make known the results of their deliberations to the Section on Friday morning, September 9th.

The motion was carried.

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## THE PROGNOSIS OF CÆSAREAN OPERATIONS.

### LE PRONOSTIC DES OPÉRATIONS CÉSARIENNES.

### DIE PROGNOSE DES KAISERSCHNITTES.

BY PROFESSOR WILLIAM THOMPSON LUSK, M. D.,

Bellevue Hospital Medical College.

If it were proposed to a physician to beat out the brains of a new-born living infant with the view to diminish the perils of the puerperal period, the proposition would certainly be rejected as too horrible for consideration, even though the physician were convinced that the theoretical grounds for the recommendation were correct. Yet there is a disposition to treat any hesitation to destroy the unborn child in the maternal interest as pure sentimentality.

I must confess that I have never felt satisfied with this bit of casuistry, and I am

sure that, for the bulk of the medical profession, nothing can be more welcome than to learn that there is statistical evidence sufficient to warrant us, in a very considerable proportion of cases, to decline, equally in the interest of the mother and the child, to lend our aid or countenance to the sacrificial operations of midwifery. By statistical evidence I do not mean bare records of deaths and recoveries, but a careful study of recorded cases, deductions from which are rational, and furnish the safest guide to scientific practice.

It has been objected to the old statistics that they contained an undue proportion of favorable cases, and it may be a fact that a large number which ended fatally were never recorded; but, on the other hand, some years ago I took occasion to analyze the histories of cases upon the death-list contained in the collection published, in 1832, by Michaelis. They all belonged to the nineteenth century, and have been included in the statistical tables that have since been published. In 34 the histories given were tolerably explicit. In one of the instances the operation was performed upon a corpse, and in others upon dying women, or under circumstances which reduced the chances of success to a slender possibility. No wonder, under such condition, Mauriceau, speaking of the Cæsarean section, declared: "If it is true that any women have escaped, it was the work of a miracle or the express wish of God, who, if He wills it, is able to rise the dead, as He did Lazarus."

But the operation is not of necessity a fatal one. As regards the Cæsarean section in this country, it is presumable that few, if any, cases have escaped Harris' vigilant inquiries. In a personal communication from him I learn that up to date there have been 153 cases, with 56 recoveries. This is undoubtedly a most discouraging report, but the percentage of recoveries should certainly teach us that the operation is capable of betterment by human ingenuity. It was until lately too much the fashion to quote the statement of Baudon, made in 1873, that there had not been a successful case in Paris in eighty years, and to ignore the results of individual operators. Thus, Winckel, Sr., practicing in a poor community, where osteomalacia prevailed, in 15 operations saved 7 mothers and 8 children; Hoebicke operated 16 times, with 11 recoveries; Marlieurat, at Lagemard, operated 6 times, and all his patients recovered; Découène of Countræ operated 6 times, and saved 5 women and 4 children, and Harris has been able to report 19 cases, in Louisiana, with 14 recoveries. In all these instances the operations were performed not in infected hospitals, but in the pure air of the country.

Again, Dufelhay's statistics showed 81 per cent. of recoveries where the operation was performed before the mother became exhausted, and Harris has shown that under similar conditions in America 21 out of 28 patients recovered.

These facts have, indeed, become sufficiently familiar, but they have been so persistently ignored by the anti-Cæsarean school in its polemic, that it becomes necessary to reiterate them in the rebuttal evidence offered by Cæsarean defenders. They show that the old operation, when performed under fitting conditions, in a healthy locality, and with sufficient skill, has had a fair measure of success. Barnes claims for the alternative operation of craniotomy, in extreme degrees of pelvic deformity, precisely the same prerequisites. "Obviously," he says, "we cannot recognize fatal cases of craniotomy in extreme deformity unless the operation was begun under selected circumstances—that is, before exhaustion had set in, and conducted with due skill and after approved methods."

But, in spite of the testimony favorable to prompt action, Harris has recently repeated that, during the last seven years in this country, in 27 operations only 5 women and 10 children have been saved, and the enemies of the Cæsarean section have pointed to these results as showing that it alone, of all the departments of abdominal surgery, has profited nothing by modern science. Without question it is, however, the preaching

of those who go around crying "Woe! Woe!" that is responsible for this melancholy decline. The operation ought never to be regarded as one of last resort. If the patient is dying, it is the duty of the physician to secure euthanasia, and not to make the death-bed the field for surgical display.

In marked contrast with the poor success attained in late years by operators in this country, Harris has recently reported, with gentle irony, the histories of nine women in advanced pregnancy whose wombs were ripped by the horns of infuriated cattle, with the survival of four women and four children, and of six cases of self-inflicted Cæsarean section, in five of which the women recovered.*

I have spoken so far of the old operation, meaning thereby cases in which nothing was done, or inadequate measures were employed, to prevent the subsequent gaping of the uterine incision. Under such circumstances in favorable cases closure was effected usually by an adhesive inflammation, which united the uterine to the abdominal walls. To this was due the favorable results when the Cæsarean section was repeated upon the same subject—eight deaths in one hundred and nineteen operations (Lundgren)—as the operation then became virtually an extra-peritoneal one. According to Sänger, only one instance is known where complete union took place throughout the entire length and thickness of the wound. Sometimes the cicatricial tissue extended the entire length, but not through the thickness of the incision, and was of a callous consistency; in others, the line of union was at points of extreme tenuity disposing to hernial protrusions, and in subsequent pregnancies to the production of rupture, while in others, again, union took place at intervals only, with the formation of fistulous openings communicating either with the abdominal walls, or with circumscribed cavities within the abdominal enclosure.

Strangely enough, even after these facts had become familiar, it was not immediately obvious that better union could be secured and the dangers of the operation lessened by the employment of a proper suture. The belief prevailed that sutures were a source of irritation, and that the alternating contractions and relaxations of the uterus during the early days of the puerperal period practically destroyed their utility. So strong, indeed, are old prejudices, that Porro's proposition to avoid the risks arising from gaping of the uterine wound by the removal of the entire uterus, has very recently been regarded not as a clumsy device, but as a surgical necessity. Indeed, it has been in this country chiefly, where tradition exerts a feeble influence, that, prior to the appearance of Sänger's exhaustive monograph, the suture has had anything like a fair trial, and Sänger strongly reinforced his argument in favor of its employment by the successes obtained through its agency by Polin, Brickell, Jenks and Lundgren. Of these Brickell is specially deserving of honor. For twenty years, in spite of sneers and ridicule, he insisted on the employment of the suture, and foresaw that the suture was destined to remove the Cæsarean section from the category of happy-go-lucky expedients to the level of a legitimate surgical procedure.

But, however others may have contributed to the foundations, it has been the glory of Sänger to crown the work by indicating with precision the manner in which the vast experience acquired of recent years in abdominal surgery could be made available for the rehabilitation of the Cæsarean section. Leopold, the first to test the improved method, has now operated thirteen times, with twelve recoveries, and in Credé's Clinic there have been seven operations (four by Sänger) with no deaths. These figures represent the possibilities of the operation. In Leopold's fatal case the cervical dilatation had been prevented by old cicatrices. Cæsarean section was performed after twenty-seven hours of hard labor. The lower uterine segment was bruised, inflamed

* Harris. "Cattle-Horn Lacerations of the Abdomen and Uterus in Pregnant Women." *Am. Jour. Obst.*, July, 1887.

and œdematous, from long-continued head pressure. Death was due to peritonitis. In similar cases Leopold now advocates the removal of the injured organ by the method of Porro.

This plan he has since followed in a case where the uterus was infected at the time of the operation. The woman recovered. Leopold, *Arch. F. Gynäk.*, vol. xxviii, p. 120.

These results sustain the dictum of Sänger that the Cæsarean section, supplemented by deep and Sym-peritoneal sutures, is devoid of danger if performed before the exhaustion of the patient, before the occurrence of infection and in consonance with the principles of antiseptic surgery.

In Credé's last report (Mittheilung aus der Geburtshulflichen Klinik in Leipzig. *Arch. F. Gynäk.*, vol. xxx, p. 328) the number of patients operated upon by Sänger's method was increased to 50, with 36 recoveries and 14 deaths. Since then there have been published six more cases, viz.: those of Döderlein, Perret, P. Bar, Lusk, Parrish and Ohage. Of these the first four ended in recovery, and the last two in death. The total mortality thus far is 28$\frac{4}{7}$ per cent., but America furnishes seven cases with but one recovery. If we deduct these, the mortality falls to 20$\frac{2}{4}\frac{0}{9}$ per cent. It is, therefore, particularly becoming in us, as chief contributors to the death rate, to inquire into the causes and complications that have led to the fatal endings. The results of such an investigation are very interesting.

1. Garrigues, *Am. Jour. Obst.*, April, 1883, p. 344. Case of lumbo-sacral kyphotic pelvis.

The patient had caries of the sacrum and lower vertebræ, with synostosis of left iliac joint, contraction of left knee and talipes equinus. She had hæmoptysis, and was suffering from cystitis and vaginitis. For a month previous to operation the patient rarely left her bed, and suffered from nearly constant vomiting, and had to be nourished from time to time by enemata. Owing to ante-partum hemorrhage, she was, at the time of the Cæsarean section, weak and suffering, pulse 124, lips blue, and with cold hands and face. It was not thought by those in attendance that the patient could survive any operation. She lived forty-eight hours.

2. Beumer, *Arch. f. Gynäk.*, Vol. xx, p. 409. Cervical myoma.

Patient had cystitis and pyelonephritis. Both kidneys were nearly destroyed. Death occurred in thirty-six hours.

3. Krukenburg, *Arch. f. Gynäk.*, Vol. xxviii, p. 411. C. V. estimated at less than 2½ inches.

Patient a dwarf, 3½ feet high, rachitic and scorbutic. She had been twenty-five and a half hours in labor, and was extremely feeble at the time of the operation. After the latter, hemorrhage, due to complete atony of the uterus, occurred. Death from collapse. Fasola ("Gaz. delle Cliniche," Nos. 24 and 25, 1886), in a case of inertia associated with great internal hemorrhage, following upon the performance of Sänger's operation, amputated the uterus. The mother recovered.

In the following cases death resulted from exhaustion or septic infection following extreme prolongation of labor. In all the indications for Cæsarean section were indisputable at the outset. They in no sense illustrate the dangers of the operation, but rather the folly of postponing action until the seeds of death have been sown.

4. Münster, *Centralblatt, 1886*, p. 82. Pelvic tumor.

Patient, after four days of labor, was conveyed to Königsberg, a railway journey of seven hours. Obstruction due to large pelvic tumor. Operation performed after four days of labor, and twelve hours after rupture of membranes. Escape of fetid gas, endometritis septica, before operation. Death in four days.

5. J. R. Weist, *Med. Rec.*, March 13th, 1886, p. 301. Retro-cervical myoma.

Operation four weeks after rupture of membranes and nine days after labor had begun. Death in twenty-four hours.

6. Drysdale, *vide* Harris, *Am. Jour. Med. Sc.*, Oct. 1885. Retro-cervical myoma. Labor has lasted two weeks. Septic infection at time of operation. Child putrid. Death in twenty-six hours.

7. Breisky, reported by Fleischmann. *Zeitschr. für Heilkund*, Vol. VII. Ovarian cyst. Patient had been nearly three days in labor. After Cæsarean section, in attempting to remove the ovarian cyst, the latter ruptured, and its contents, which were purulent, escaped into the peritoneal cavity. Escape of pus from pyo-salpinx, which coexisted. Death in twenty-eight hours, from septicæmia.

8. Breisky, *Ibidem.* Contracted pelvis. Patient three days in labor. At time of removal of child decidua was found of a whitish-gray color, due to septic infection. Death two and a half days after operation, from suffocation, endometritis and sero-purulent peritonitis.

9. Parrish, *Trans. Am. Gynæcological Society*, Vol. XI, p. 424.

Patient in labor forty-two hours. Waters had ruptured thirty hours; futile attempts to extract child after craniotomy. At time of operation pulse 124, patient greatly exhausted. Death in twelve hours, from exhaustion. Commencing septicæmia.

Finally, there remains a limited number of cases in which death was due to some defect in the antiseptic precautions.

10. Ehrendorfer, *Arch. f. Gynäk.*, Vol. XXV, p. 128. Fibroma of abdominal fascia invading pelvic cavity. Patient had had three living children. Membranes ruptured at 3 A. M. on September 28th; at 4 P. M. on the 29th inst., Cæsarean section; escape of meconium into abdominal cavity. Ligature around left tube to prevent hemorrhage. Death in five days, from peritonitis purulenta ichorosa. Uterine cavity contained strips of decidua infiltrated with pus, with necrosis of tissue between the sutures.

11. Jewett, *N. Y. Med. Jour.*, Aug. 29th, 1885. Profuse hemorrhage in latter part of pregnancy, constant pain, no sleep. Death from septic peritonitis, forty-four hours after operation. Infection probably due to case of erysipelas at the time in the hospital.

12. Ohage. Rachitic dwarf; labor induced; operation twelve hours later, when os was size of a quarter of a dollar; death on fifth day, from diphtheritic endometritis.

In addition to the above, Credé reports three cases communicated to him by letter, one operated upon by Neugebaur-Bieganski, of Warsaw, and one by Morisani, of Naples, where the operation, though performed under apparently favorable conditions, was followed by death, due to septic infection.

The more these cases are studied, the more evident it becomes that the deaths were the result of preventable causes, except in instances where the operation was fatally handicapped by antecedent disease. Indeed, the prognosis of the modified Cæsarean section appears to be favorable whenever performed with due surgical skill, and under circumstances which admit of surgical success.

As regards the saving of infant life, the results have been hardly less gratifying. In times past the anti-Cæsarean school has furnished statistical records showing a heavy infantile mortality associated with the operation, but in the fifty-six cases in which the Sänger precautions were employed, only six children were born dead, and of these four were putrid at the time the operation was performed.

In Germany proper, there have been thirty-five operations, with the recovery of thirty-one women and the saving of thirty-three children. In this country, in seven operations, there have been saved one woman and three children. In view of this unflattering discrepancy it seems well worth our while to inquire in what way we can so improve our methods that our results may no longer give to the modern Cæsarean section a sinister aspect not justly its due.

Now, in the first place, progress is not to be expected on our part until our profes-

sional men as a body make themselves familiar with the import of the various forms of pelvic obstruction, and learn to discriminate during pregnancy the conditions which indicate respectively the induction of premature labor, the Cæsarean operation, craniotomy or a Fabian policy. Of course, the discussion of these and similar questions is not germane to my subject, but it may not be out of the way to note that craniotomy is not available in cancerous degeneration of the lower uterine segment and vagina, in obstruction due to fibroids and other tumors occupying the pelvic cavity, and in cases where the conjugate diameter measures less than two and a half inches. I do not pretend to claim that craniotomy furnishes no good results in these cases, but that the operator takes a gambler's risk, with the odds heavily against him. Even where the conjugate measures from two and a half to three inches the Cæsarean section still seems to me to be the preferable choice, as with those dimensions, unless the transverse diameter happened at the same time to be spacious—a most exceptional occurrence—craniotomy is extremely hazardous, requiring a complete obstetrical armament and great experience on the part of the operator, to enable him to avoid inflicting serious, if not fatal, injury to the tissues between the child's head and the pelvic brim.

To be sure, Barnes asserts that "Craniotomy, done under fair conditions, such as are postulated for Cæsarean section, that is, done at a chosen time, with due skill, does not involve any maternal mortality;" but a careful perusal of his subsequent remarks shows that his statement was intended to apply to women with minor degrees of contracted pelvis only. Barnes (*British Gynæcological Journal*, Part VIII, 1886, p. 315), argues that by sacrificing the living child at term the woman's life is saved, and subsequently, by the employment of premature labor, she becomes the mother of living children. But with less than three inches in the conjugate even premature labor affords but little encouragement, so far as to hope for the preservation of the child.

Merkel (*Arch. f. Gynäk*, Vol. XXI, p. 461) reports 100 cases of craniotomy from the Leipsic clinic, with eight deaths. He congratulates the clinic upon results never obtained elsewhere.

Thorn (*Arch. f. Gynäk.*, Vol. XXIV, p. 437) reports 80 cases from the Halle clinic, with ten deaths. How simple these cases were, for the most part, is shown by the fact that in Merkel's list of 68 multiparæ, 49, and in Thorn's list of 56 multiparæ, 39 had previously given birth to living children.

Unquestionably, defective diagnosis has, so far, in this country, proved the most serious bar to progress in obstetric surgery. Every year I witness cases where horrible mutilation, due to ineffective attempts at delivery, have been inflicted before it was suspected that the obstruction was insurmountable.

American women have in times past enjoyed so large a degree of immunity from the more pronounced forms of dystocia, that our practitioners are too much disposed to regard Dame Nature as invariably kind to the parturient woman. Very few, indeed, attempt to realize the pernicious influence of spinal curvatures and hip diseases upon the pelvic contours, or try to acquire the art of pelvimetry, and yet these things belong to the A B C of practice. A knowledge of them should constitute the difference between an educated physician and an experienced monthly nurse. This is delicate ground, and I do not refer to it in any carping spirit. I know that the lack of interest is due to a sense of the remoteness of the contingencies which will render such knowledge available. But more artificial modes of life, the pressure of population in large cities, and an unprecedented immigration are already working among us a perceptible increase in the causes of difficult labor, and with the departure of the old easy going order of things comes the need of better equipment, and an increased sense of responsibility on the part of medical attendants.

It is of good omen that Parrish, armed with the weapons furnished by Harris' statistics, presented to the members of the American Gynæcological Society a year ago

a most eloquent appeal to give this subject their earnest thought and attention. I add my voice in the same direction, from a sense of duty, and trust the time is at hand when all our leaders will lend their aid and advocacy to the work.

It is not to be expected that in every case, after a correct diagnosis has been made, and the necessity of the Cæsarean section has been recognized, the practitioner should undertake the operation himself. It is not desirable that the Cæsarean section should be performed without assistants, without proper instruments, or without preceding orderly arrangements. Nor ought the operator to trust to the inspiration of the moment, but he should possess at least a technical familiarity with every detail that experience has shown to limit the risks and to contribute to the patient's safety. If the physician is timid, or is not so situated that he can operate under advantageous conditions, it will generally be easy, when the diagnosis has been made prior to the advent of labor, for him to entrust the case to an expert in abdominal surgery.

We have many laparotomists operating with brilliant results. They are not all upon the seaboard or in large cities, but are so scattered as to form centres accessible to extensive areas. They possess the advantages of experience, and of needful preparation. With the general coöperation of our professional men there is no reason why they should not rival the successes won in Leipzig and Dresden. They need, however, to open their eyes to the work of our neighbors, and to equip themselves for the special field of saving infant life. Mr. Tait has doubtless accomplished great good teaching surgical means for the relief of tubo-ovarian disease, but it would be an added glory to our laparotomists if they would, on occasion, round out their work of sterilizing women by conferring upon them the blessing of maternity.

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Dr. JOSEPH KUCHER, in the absence of the author, read the following paper :—

## ÜBER DEN KAISERSCHNITT.

### ON CÆSAREAN OPERATION.

### SUR L'OPERATION CÉSARIENNE.

(As Introduction to a Discussion.)

BY M. SÄNGER, M. D.,

Lecturer at the University, Late President of the Gynæcological Society, of Leipzig; Corresponding Member of the Medical Society of Christiania; Honorary Member of the Chicago Gynæcological Society.

MEINE HERREN ! Indem ich lebhaft bedauere, durch triftige Abhaltung verhindert gewesen zu sein, dem ehrenvollen Auftrage Folge zu leisten, die Discussion zu dem Thema über den verbesserten Kaiserschnitt persönlich einzuleiten, hoffe ich, für meine schriftlich niedergelegten Einführungsworte noch mehr Nachsicht zu finden, als ich sie für einen mündlichen Vortrag erbeten haben würde.

Die Vereinigten Staaten können den Ruhm, ein Land des Fortschrittes par excellence zu sein, für alle Gebiete menschlicher Thätigkeit in Anspruch nehmen, mehr als irgend ein Land der Welt. Auch die Fortschritte in der technischen Verbesserung des Kaiserschnittes, wie sie in den Errungenschaften der letzten Jahre gipfeln, sind durch americanische Aerzte wesentlich gefördert, ja zum Theil eingeleitet worden. *Horatio Storer* war ein Vorläufer *Porro's*. *Thomas* und *Skene* sind die Erneurer der Gastro-Elytrotomie. *Frank E. Polin* und *Warren Brickell* waren die Ersten, welche Silberdraht zur Uterusnath verwandten, wie überhaupt nirgends sonst die Nath der Uteruswunde, vor der

jetzigen neuen Aera, so zahlreiche und erfolgreiche Anwendung fand als in America. *Rob. P. Harris* mahnte immer wieder zur frühzeitigen Vornahme der Operation als eines wesentlichen Factors für ihr Gelingen. Durch seine musterhaften statistischen Arbeiten förderte er nicht nur die Kenntniss Dessen, was auf dem Gebiete des Kaiserschnittes bereits geschehen war, sondern zeigte auch durch dieselben, worauf Erfolg und Misserfolg beruhten, wo die Hebel zu Verbesserungen anzusetzen seien.

Ihm verdanke ich auch in erster Linie die Verbreitung der Ergebnisse meiner eigenen Schriften und Operationen in America, und irre ich wohl nicht, wenn ich als Grund der mir widerfahrenen Ehre, das Thema "Verbesserungen des Kaiserschnittes" einleiten zu dürfen, den Ruf ansehe, welchen meine Bemühungen und Arbeiten auf diesem Gebiete mir hier verschafft und die schmeichelhafte Ernennung zum Ehren-Vicepräsidenten dieser Section eingetragen haben.

Ein Jahrhundert mühte man sich ab, die Schrecknisse und Gefahren des Kaiserschnittes zu beseitigen, aber erst unserer Zeit des grössten Aufschwunges, den die Chirurgie und die ihr verwandte Geburtshülfe je erlebte, konnte es gelingen, diese Aufgabe wirklich zu lösen und die Operation zu einer so lebenssicheren zu gestalten, dass damit auch zugleich das andere grosse Problem eines Ersatzes der Craniotomie des lebenden Kindes gelöst war.

Diesem Umschwunge ging die gewaltigste Revolution voraus, welche die Geschichte des Kaiserschnittes gesehen hat — die Operation *Porro's*. Die Trostlosigkeit der Resultate des Kaiserschnittes bis dahin lässt es als begreiflich erscheinen, dass man die neue Operation, welche ihre Erfolge nur mit dem schweren Opfer der Aufgabe des Uterus und der Ovarien erkaufen liess, mit Enthusiasmus begrüsste und den "alten" Kaiserschnitt durch sie für beseitigt wähnte. Nicht genug des Radicalismus, erblickte *Bardenheuer*, als die *Porro*-Operation auf ihrem Höhepunkte angelangt war, erst in der vollständigen Exstirpation der Gebärmutter das wahre Heil des Kaiserschnittes. So weit ab war man von der immerdar gleichen Aufgabe abgekommen, das Kind "caeso matris utero" zu Tage zu fördern, den Uterus aber, ohne Gefährdung der Mutter, zu erhalten.

An theoretischen Einwendungen, moralischen und juridischen Bedenken gegen die "verstümmelnde" *Porro*-Operation hatte es von Anfang an nicht gefehlt. So lange sie aber nicht durch technische Verbesserungen des conservativen Kaiserschnittes mit mächtiger Ueberbietung ihrer eigenen Resultate bekämpft wurde, konnte ihre Stellung nicht erschüttert werden. Und sie wurde durch dieses einzig richtige Kampfmittel erschüttert!

Als ich selbst im Jahre 1881 in diesen Feldzug gegen die Porro-Operation als alleinige Kaiserschnittoperation eintrat, hatten erst leichte Geplänkel gegen dieselbe begonnen. Nur *eine* Errungenschaft war schon gemacht worden, von der Freund und Feind Nutzen zog: die *Antisepsis*, welche die Eröffnung der Bauchhöhle unendlich gefahrloser als früher gestaltete, so dass dieser Theil der Operation sich für beide Methoden gleich verhalten musste. Es galt dann aber noch immer, der *Porro*-Operation ihre Hauptstütze zu nehmen, nämlich die damals feststehende, verzweifelte Annahme, dass die beiden Hauptgefahren des classischen Kaiserschnittes: primäre und secundäre Blutung aus der Schnittwunde und aus der Höhle des Uterus, sowie septische Infection durch Uebertritt von Lochien in die Bauchhöhle aus der klaffenden Uterushöhle, anders nicht beseitigt werden könnten, als durch Abtragung des Uterus selbst. Ich hatte damals einen Kaiserschnitt ausgeführt, wegen Myoma retrocervicale bei Bestand einer, von einer früheren Operation herrührenden Nierenbecken-Bauchfistel, welche dicht neben dem Bauchschnitt mündete. Die Uteruswunde wurde mittels zehn Seidensuturen geschlossen; nach acht Tagen öffnete sich der untere Winkel der Bauchwunde: die vollständig per primam intentionem geschlossene Uteruswunde lag frei zu Tage, so dass ich sämmtliche Seidenfäden wieder entfernen konnte. *Diese erste direkte Beobachtung einer Primärheilung der Uteruswunde brachte mir die Ueberzeugung, dass sich*

*dieselbe durch geeignete Nath, welche ich dann suchte und fand, auch in anderen, ja in allen Fällen erzielen lassen müsse, wodurch die Gefahren der Blutung und des Lochialaustrittes in die Bauchhöhle beseitigt würden.* Dass diese Annahme richtig war, hat sich in der Folge noch glänzender gezeigt, als Anfangs erwartet werden konnte, *indem der Verschluss der Uteruswunde nach dem jetzt allgemein anerkannten Princip sich auch noch in solchen Fällen als haltbar erwies, wo septische Metro-Endometritis und Metro-Peritonitis aufgetreten waren.*

Daher bildet denn auch der Verschluss der Uterus-Schnittwunde durch eine den anatomischen und physiologischen Verhältnissen des Organes angepasste rationelle und exacte Nathmethode, welche eine Primärheilung der Wunde zu sichern geeignet ist, den Grund- und Eckstein des verbesserten Kaiserschnittes. Nur das Gelingen der Uterusnath und der Heilung des verletzten Uterus per primam intentionem sicherte den endgültigen Sieg über die *Porro*-Operation, welche in einem ehrenvollen Frieden mit dem conservativen Kaiserschnitte ihre richtige Stellung angewiesen erhielt, als ein für bestimmte Ausnahmefälle und Indicationen segensreicheres und unvergängliches Verfahren.

Es kann gewiss nicht meine Aufgabe sein, an dieser Stelle, vor einem Publicum, welches die Entwickelung des verbesserten conservativen Kaiserschnittes innerhalb der letzten Jahre rege verfolgt hat, mich in Details der Operation zu verlieren, schon um der Discussion nicht vorzugreifen. Ich werde mich daher nur einzelnen wichtigeren und streitigen Punkten zuwenden, wobei ich mich ungefähr an die Aufeinanderfolge der einzelnen Akte der Operation halten und bei ihrer Technik etwas länger verweilen werde.

Es kann mit *Robert P. Harris* nicht oft und entschieden genug hervorgehoben werden, *dass der Kaiserschnitt möglichst frühzeitig vorgenommen werde:* wenn irgend "periculum in mora", so ist es hier! Die Scheu vor der Operation ist jetzt nicht mehr berechtigt, wo man ihre Schwierigkeiten und Gefahren zu beherrschen gelernt hat. Noch schlimmer als blosses Zuwarten, wo man handeln sollte, sind *fruchtlose Entbindungsversuche* durch Zange und Wendung, welche geradezu widersinnig erscheinen, wenn sie bei Beckenverengungen vorgenommen werden, die ihrem Grade nach die Entwickelung eines lebenden und reifen Kindes von Vornherein ausschliessen. Ganz besonders verwerflich sind die Zerstückelungsoperationen bei den höchsten Graden von Beckenenge mit einer Conjugata vera von 6 cm. und abwärts, Bravourleistungen, welche selbst unter der Hand grosser Meister der Geburtshülfe fast immer misslingen. Angesichts einer durch genaue Untersuchung sicher festgestellten absoluten Beckenenge gibt es heutzutage kein Besinnen mehr: hier muss der Kaiserschnitt ausgeführt werden, "without delay". Etwas anders liegen die Verhältnisse, wo es möglich ist, die Frau per vias naturales, wenn auch unter Opferung des Kindes, zu entbinden, also bei relativen Indicationen zum Kaiserschnitt. Wenn man bisher in jedem schwierigen Geburtsfalle wegen Beckenenge die Craniotomie in Betracht zog, so muss man dies jetzt mit dem Kaiserschnitt. Ist man entschieden, diesen vorzunehmen, so hat man die Verpflichtung, unter Hinweis auf die dadurch allein mögliche Rettung des Kindes, sich die Einwilligung der Eltern zur Operation zu erwerben, um dann ebenfalls so früh wie möglich und ohne nutzlose andere Entbindungsversuche, bevor Mutter und Kind Schaden gelitten haben, dazu zu schreiten. Der Einhaltung dieser Grundsätze haben die neueren deutschen Kaiserschnitt-Operateure ihre ausgezeichneten Resultate ganz erheblich mit zu verdanken, während gerade die minder guten Erfolge der americanischen Collegen innerhalb der letzten Jahre auf ihre nicht gehörige Beachtung zurückzuführen sind, wobei freilich die Schuld meist nicht den Operateur, sondern den vorher behandelnden Geburtshelfer trifft.

Von wesentlicher Bedeutung für das Gelingen der Operation sind weiter die *Vorbereitungen* zu derselben. Die "gute alte Zeit", wo man den Kaiserschnitt "with a

common razor" ausführen konnte, ist vorüber: er ist jetzt zur "geburtshülflichen Laparotomie" geworden und bedarf noch weiter gehender Zurüstungen, als z. B. eine Ovariotomie, da sich die Sorge des Operateurs, ausser über die zu eröffnende Bauchhöhle, über die gesammten Gebärorgane und über das Kind zu erstrecken hat.

"Die klassische Einfachheit des klassischen Kaiserschnittes ist für immer dahin. Dafür ist aber durch ein weitläufigeres Operationsverfahren unter Heranziehung antiseptischer Vorkehrungen, unter Uebertragung aller nur irgend verwerthbaren Mittel der heutigen Laparotomie-Technik, unter Schaffung einer verlässlichen Nath der Uteruswunde die so lange gesuchte Sicherheit des Erfolges gewonnen worden."

Ich habe gewiss nicht nöthig, im Detail zu sagen, welche Instrumente und Utensilien zur Operation erforderlich sind, wie die Antisepsis zu handhaben, wie die Kreissende vorzubereiten sei, bevor das Messer in die Hand genommen werden kann. Der geschickte und mit dem Geiste seiner Aufgabe vertraute Arzt wird unter den schwierigsten Umständen und unter den dürftigsten äusseren Verhältnissen dennoch dieselbe lösen. Bei aller Complicirtheit der operativen Technik lässt sich, ohne von dieser etwas Wesentliches aufzugeben, Vieles vereinfachen, Vieles improvisiren. Einen weiteren Unterschied zwischen Vornahme des Kaiserschnittes in einem Hospital und in der Aussen-Praxis darf es heutzutage nicht mehr geben. Wenn die Operation auch jetzt weit höhere Ansprüche an den praktischen Arzt stellt, so kann er dennoch, wofern er nur in Etwas mit ihrem Geiste und ihrer Ausführung vertraut ist, denselben vollauf genügen. Sicherlich wird die zukünftige Generation von Aerzten die Operation gänzlich beherrschen lernen.

Viel hängt für das Gelingen der Operation auch ab von der Güte und Geschicklichkeit der *Assistenz*, besonders hinsichtlich der Narkose. Nicht jeder Narkotiseur versteht es, Erbrechen und Darmprolaps zu verhindern, nicht jeder Assistent, Einfliessen von Blut und Fruchtwasser in die Bauchhöhle zu vermeiden. Daher ist es stets gut, wenn der allein verantwortliche Operateur jeden Assistenten mit fester Instruction auf seinen Posten stellt und strikte Einhaltung derselben vorausfordert.

Es ist oft ein langer schwerer Weg vom Beginne der Geburt bis zum Momente, wo endlich das Scalpell ergriffen werden kann, aber er muss durchgekämpft werden.

Für alle Zeiten wohl wird der *Bauchschnitt* in der Linea alba nach *Deleurye* bleiben, aber er muss so angelegt werden, dass er mit dem Uterusschnitt möglichst genau übereinstimme. Schon durch die Bauchhaut hindurch soll man daher die Länge und Lage des letzteren bemessen. Der Bauchschnitt trifft alsdann, — indem der Nabel einfach als nicht vorhanden angesehen wird, — gewöhnlich auf die Mitte von Fundus Uteri und Symphyse, in einer Ausdehnung von durchschnittlich 16 cm., wenn der Uterus nicht in toto herausgewälzt wird. Die *Eventration des nicht eröffneten Uterus* ist wegen nothwendiger Verlängerung des Bauchschnittes, wegen der Möglichkeit von Darmprolaps nicht rathsam, ausser bei abgestorbener Frucht, ausser bei mangelhafter Assistenz, wenn man ganz sicher gehen will, dass kein Uterusinhalt in die Bauchhöhle gelange, was aber durch den Assistenten, welcher die Bauchwände sonst an den Uterus angedrückt halten muss, unter allen Umständen vermieden werden kann. Normales Fruchtwasser, etwas Blut, ist aber, wenn dennoch in die Bauchhöhle gelangt und nicht wieder aufgetupft, unter aseptischen Verhältnissen unschädlich, wie die glücklichen Fälle von Gastrotomie nach Ruptura Uteri am besten beweisen. Für völlig unnöthig und durchaus verwerflich muss ich es aber erklären, um das untere Segment des uneröffnet herausgewälzten Uterus behufs Blutabsperrung einen Gummischlauch zu legen, weil dadurch die Gefahr von Asphyxie des Kindes, von Festklemmung einiger Kindestheile heraufbeschworen wird, welche unter Umständen gerade dann die Lösung des Schlauches nothwendig macht, wo die Hände des Operateurs Wichtigeres zu thun hätten. Die Meinung, dass durch die vorherige Umlegung des Schlauches Blut gespart werde, ist eine rein fictive: bei Incision des Uterus in situ und sofortiger Herauswälzung

desselben während und mit der Extraction des Kindes fliesst kaum mehr Blut ab, als gerade in den Gefässen des Uterus enthalten ist. Es fliesst etwa eben so viel Blut aus, wie aus einem supravaginal amputirten, myomatösen Uterus nach elastischer Ligatur. Diese Blutmenge *muss* ausfliessen. Hat sich der Uterus nach seiner Entleerung retrahirt, dann können wir sofort und mit mehr Erfolg einem weiteren Einströmen von Blut in das aufgeschnittene Organ wehren als vor dessen Eröffnung. Sind die Hände des Bauch-Assistenten frei, vielleicht weil die Bauchwunde hinter dem eventrirten, uneröffneten Uterus durch Klemmen oder Nähte geschlossen wurde, so ist es jedenfalls besser, die seitlich gelegenen pulsirenden Hauptgefässe aufzusuchen und mit den Fingern zu comprimiren. Je schneller in diesem Stadium der Operation vorgegangen wird, um so weniger ist all dies nothwendig. Ich habe nie weder den uneröffneten Uterus herausgewälzt, noch, was dabei selbstverständlich, den Gummischlauch anders herumgelegt als um den eventrirten, entleerten Uterus, trotzdem ich mehrmals die Placenta mit durchschneiden musste.

Für gewöhnlich möge daher der Uterus ohne Weiteres in situ incidirt werden: es ist einfacher, schneller und für das Kind gefahrloser.

Im Bezug auf den *Uterusschnitt* und seine Richtung sehen wir noch ähnliche Differenzen wie seinerzeit hinsichtlich der Richtung des Bauchschnittes. Ich bin aber fest überzeugt, dass der vordere mittlere Mediaausschnitt, ebenso wie der *Deleurye'sche* Schnitt für die Bauchwand, der herrschende bleiben wird, wie denn auch der von *Kehrer* in neuerer Zeit wieder angewandte tiefe Querschnitt keinerlei Verbreitung fand, wenn er auch theoretisch, für Fälle von abnormer Dehnung des unteren Uterinsegmentes, Einiges für sich hat. Die Möglichkeit, das Kind mit dem Kopf voran durch den tiefen Querschnitt heraustreten zu lassen, wird nicht aufgewogen durch seine Schwierigkeiten und Gefahren (Incongruenz des Bauch- und Uterusschnittes, stärkere Blutung, mangelhafte Contraction des unteren Uterinsegmentes, Weiterreissen in die Lig. lata hinein, Blutung subperitonealer Hämatome u. a. m.). So bleibt der mit dem Bauchschnitt genau correspondirende mittlere Längsschnitt in den Uterus das einfachste und geeignetste Verfahren. Bei seiner Ausführung vermeide man das an der lockeren Haftung des Peritoneum kenntliche untere Uterinsegment und verlängere den Schnitt, falls er sich zu kurz erweist, stets nach Oben, mittels Knopfmesser oder geknöpfter Scheere. In früherer Zeit, vor Anwendung der Uterusnath, erlagen sicherlich viele Fälle an Blutungen aus den grossen Gefässen des dünnen und schlaffen unteren Uterinsegmentes, welche durch den zu weit herabgehenden Schnitt getroffen wurden.

Trifft der Schnitt auf die Placenta (*Placenta prævia cæsarea*), so durchschneide man sie schnell oder löse sie seitwärts ab: unter drei Fällen, wo mir dies begegnete, habe ich ein Mal das erstere, zwei Mal das letztere Verfahren eingeschlagen, ohne dass die Blutung stärker, die Nath des Uterus schwieriger oder unsicherer gewesen wäre. Ich kann daher in dem Vorliegen der Placenta, auf welches man in etwa der Hälfte der Fälle gefasst sein muss, durchaus nichts Bedenkliches sehen, da nicht einmal nennenswerth stärkerer Blutverlust damit verbunden zu sein braucht und sich im Uebrigen die durchschnittene Haftfläche der Placente an der vorderen Uterinwand nicht anders verhält, als wenn die Placenta der intacten hinteren Uterinwand aufsass.

Die *Entwickelung der Frucht* geschieht am leichtesten und schnellsten an den Füssen. Es ist rein theoretisch auch hier die Geburt "capite prævio" als die Norm hinzustellen. Bleibt der nachfolgende Kopf stecken, so ziehe man ihn nicht gewaltsam durch, weil sonst die Schnittwunde leicht nach Unten weiterreissen kann, sondern verlängere dieselbe rasch nach Oben.

Während dem muss der am Bauche angestellte Assistent mit grösster Aufmerksamkeit der raschen Verkleinerung des Uterus folgen und, indem die Herauswälzung desselben während und mit der Extraction des Kindes bewirkt wird, mit *einem* Griffe der Hände die Bauchwunde hinter dem Uterus und eng bis zu diesem heran schliessen.

Der Assistent kann sogar gleichzeitig das untere Segment des eventrirten Uterus mit comprimiren. Schon die Herauswälzung, die Abbiegung des Uterus nach Vorn, eine leichte Torsion um seine Längsaxe kann, abgesehen von seiner sofort eintretenden Retraction und Contraction, die Blutung fast völlig zum Stehen bringen. Am bequemsten ist es freilich, behufs Blutabsperrung sofort einen Gummischlauch anzulegen und, nachdem er mässig, nicht ad maximum angezogen wurde, an seiner Kreuzungsstelle durch eine kräftige Arterienpincette zu einem Ring zu schliessen. Man kann alsdann das Operationsgebiet vom Blute reinigen, die Bauchhöhle wieder freigeben, um auf die Därme einen grossen Schwamm oder eine Serviette zu legen, die Bauchwunde nachher durch Klemmen verschliessen, damit die Hände des Operateurs wieder disponibel werden. Ich selbst und die meisten Anderen haben keinerlei Nachtheil von der Anwendung des Gummischlauches gesehen, aber sie scheint doch einige Gefahren mit sich zu bringen, die sich nach seiner Abnahme geltend machen können, wie Thrombose und Embolie von Gerinnseln, Atonia Uteri und stärkere Blutung, Luftaspiration und Luftembolie. In einem von *Krukenberg* beschriebenen Falle ist vielleicht durch das Zusammenwirken von Blutung und Luftembolie der Tod herbeigeführt worden.

Ich möchte daher rathen, die Anwendung des Gummischlauches möglichst einzuschränken und zu versuchen, der Blutung, die nur ausnahmsweise noch stark ist, durch die schon angeführten einfachen Maassnahmen zu beherrschen.

Auf spontane Lösung der Nachgeburt zu warten, hat keinen Sinn. Man trenne sie von den Schnitträndern her unter Zurücklassung von möglichst wenig Decidua und achte dabei auf Durchgängigkeit der Cervix. Zuweilen invertirt sich die hintere Wand des Uterus zur Schnittwunde heraus: die Zurückstülpung macht keine Schwierigkeit.

Sehr empfehlenswerth ist es, nach vollendeter Ausräumung des Cavum Uteri etwas Iodoform einzubringen, wovon auch in das Collum hinabgeschoben werden kann.

Inzwischen wurde der Uterus mit warmen, in schwache Sublimatlösung getauchten Mull-Servietten bedeckt gehalten, und beginnt nun der wichtige Akt der *Nath des Uterus.*

Das von mir aufgestellte Princip der rationellen Nath der Uteruswunde basirt hauptsächlich auf drei Punkten:

1) Genaueste Vereinigung der Wundflächen durch zahlreiche Suturen, welche dieselben breit und innig an einander legen;
2) Vermeidung von Stichkanälen im Cavum Uteri;
3) Besondere, flächenhafte Vereinigung der Serosae Uteri durch zahlreiche oberflächliche Suturen.

Dieses Princip kann natürlich in sehr verschiedener Weise eingehalten werden und hatte ich selbst schon acht differente Nathmethoden angegeben, von welchen ich der doppelreihigen Knopfnath — tiefe serös-musculäre und oberflächliche sero-seröse Suturen — den Vorzug einräumte. In neuerer Zeit sind dann noch weitere Combinationen von Nathmethoden, wie sie in der plastischen und Darm-Chirurgie gebräuchlich sind, mit Vortheil zur Anwendung gekommen, und gruppiren sich die gebräuchlichsten derselben jetzt folgendermaassen:

1) *Doppelreihige Knopfnath* (*Leopold*, *Sänger*, *Schauta u. A.*).
2) *Fortlaufende Nath.* Dieselbe ist bisher noch niemals ausschliesslich zur Anwendung gekommen, etwa wie bei frischen Dammrissen, sondern stets in Combination mit Knopfnäthen. Meist wurde sie als *fortlaufende sero-seröse Nath* angelegt, von *Leopold*, *Zweifel u. A.*
3) *Etagennath*; als fortlaufende angewandt von *Schröder*, *Hofmeier;* als unterbrochene von *Krukenberg*, *Lebedeff*, welcher sogar in drei Etagen nähte. Die letztere Abart kann auch als *versenkte* Nath bezeichnet werden.

Läge diesen zahlreichen Nathmethoden nicht ein gemeinsames Princip zu Grunde, so wäre es allerdings schwierig, sich herauszufinden. Alle diese Variationen beruhen

aber nur auf Individualismus, und kann von keiner einzelnen behauptet werden, dass sie bessere Resultate aufzuweisen habe als andere. Den Preis der grössten Einfachheit dürfte aber entschieden der doppelreihigen Knopfnath, sowie ihrer Combination mit fortlaufender sero-seröser Nath zukommen.

Gegen die Etagennath möchte ich sogar den Einwand machen, dass es gewagt sei, durch Versenkung von zuviel Nathmaterial zwischen die Wundflächen, welches unter Umständen als Fremdkörper wirken kann, die Verklebung der Uteruswunde zu gefährden, um so mehr, als sich jene einfachste Nathmethode durchaus bewährt hat.

Die *subperitoneale Resection von kleinen Streifen der Muscularis Uteri* hatte ich seiner Zeit empfohlen für Fälle, wo sich die Serosae Uteri nicht ohne Weiteres einwärts ziehen und flächenhaft mit einander vereinigen liessen. Hat sich nun auch herausgestellt, dass diese Maassregel seltener nöthig ist, als ich ursprünglich gedacht hatte, so ist sie doch zuweilen das einzige Mittel, um die flächenhafte Vernähung der Serosae zu ermöglichen, wie recht deutlich der zweite Fall von *Chiara* beweist, welcher in der Länge von zwei Dritteln der Wunde die vorquellende Muscularis abtrug.

Was nun das *Nathmaterial* anlangt, so kommen nur die drei Arten: Silberdraht, Seide und Catgut in Betracht.

Mit *Silberdraht* sind die besten Resultate erzielt worden, welche man von einer längeren Reihe von Fällen des verbesserten Kaiserschnittes kennt. Aber so zuverlässig, reizlos, aseptisch der Silberdraht auch ist: resorbirbar ist er nicht und zur fortlaufenden Nath lässt er sich nicht verwenden. Das ist zu viel verlangt von ihm.

Für die Methode der doppelreihigen Knopfnath oder für die tiefe sero-musculäre Knopfnath in Verbindung mit der oberflächlichen fortlaufenden Nath (feine Seide oder Catgut) würde ich ihm, mit *Schauta*, nach wie vor, gegenüber der (stärkeren) Seide, den Vorzug einräumen. Es muss nur reiner, nicht legirter, weicher Silberdraht sein.

Die *Seide* ist unstreitig das bequemste Nathmaterial. Sie wird auch nach längerer Zeit resorbirt. Aber es ist *Schauta* Recht zu geben, dass sie durch stärkere Umschnürung der Gewebe leicht Nekrosen erzeugt, dass sie schwerer aseptisch zu halten sei. Hat man jedoch die Garantie ihrer aseptischen Beschaffenheit, fasst man nicht zu viel Gewebe in die Nathschleife, zieht man diese nicht übermässig an, so kann die Seide dem Silberdraht nicht nur gleichwerthig sein, sondern sogar überlegen durch leichtere Einlegung und Knüpfung, durch endliche Resorption, daher denn auch zahlreiche Kaiserschnittfälle, wobei nur mit Seide genäht wurde, ohne Reaktion verlaufen sind. Da aber obige Nachtheile der Seide dem Silberdraht nicht anhaften, so muss diesem dennoch absolut der Vorrang eingeräumt werden.

Es ist hierbei immer nur stärkere Seide für die tiefe sero-musculäre Knopfnath oder für die unterbrochene Etagennath von *Lebedeff* gemeint: *die feine Seide* für die sero-seröse Nath, gleichviel ob sie unterbrochen oder fortlaufend angelegt wird — ist nur mit dem feinen Catgut in Parallele zu setzen, dem sie völlig ebenbürtig ist.

Das an sich idealste Nathmaterial, das *Catgut*, gab bekanntlich in seiner früheren mangelhaften Herstellung die schlechtesten Resultate für den Kaiserschnitt, woran aber ganz entschieden auch mangelhafte Nathmethoden mit die Schuld trugen, wie in den Fällen, wo die Catgutschleifen lange vor ihrer Resorption, aufgeknotet oder durchgeschnitten, der klaffenden Uteruswunde aufliegend gefunden wurden. Jetzt ist auch dem ersteren Uebelstande abgeholfen und kann durch Präparation mit Chromsäure, oder mit Sublimat und Ol. Juniperi ein dauerhafteres, langsamer resorbirbares Catgut hergestellt werden, so dass man wagen kann, es als ausschliessliches Nathmaterial zu nehmen. Besonders bewährt hat sich das Chrom-Catgut, von dem dies auch im Vornherein am ersten erwartet werden konnte. Unter den nach meiner Methode operirten Kaiserschnittfällen sind neun, wobei ausschliesslich Catgut zur Verwendung kam: sie sind sämmtlich geheilt. Chrom-Catgut wurde von *Leopold* in seinen letzt-

veröffentlichten drei Fällen, von *Zweifel* in einer Serie von vier Fällen angewandt. Für die beiden anderen Fälle von *Ehlers* und *Chiara* ist nicht angegeben, was für Catgut gebraucht worden ist. Diese tadellosen Resultate mit "Hart-Catgut" sind so ermunternd, dass die Frage nach dem geeignetsten Nathmaterial bald entschieden sein wird, wenn eine weitere Reihe glücklicher Operationen die Besorgniss vor seiner Unsicherheit gegenüber dem Silberdraht und der Seide vollends vertrieben haben wird. "Das Bessere ist der Feind des Guten."

Die Zweifel, welche Anfangs in die Verlässlichkeit der neuen Uterusnath gesetzt wurden, sind wohl jetzt überall verstummt.

Sie hielt auch dann fest und liess kein Blut durchtreten, wenn nach ihrer Vollendung schwere *innere Blutungen* auftraten.

So haben *Freund, jr.*, und *Chiara* in der Besorgniss, dieser Blutungen nicht Herr werden zu können, trotzdem der Uterus einem unverletzten Organe gleichkam und sie ihn direct unter den Händen hatten, doch noch die Porro-Operation ausgeführt. Das Vorkommen solch schwerer Blutungen ist wohl verständlich, auch ohne Annahme der Verletzung eines grösseren Gefässes. Wahrscheinlich handelte es sich um hochgradige Atonia Uteri infolge allgemeiner Ursachen, wie Krankheiten, Schwäche der Frau, sowie Lähmungszuständen der Nerven und Muskeln des Uterus, vielleicht infolge ihrer Durchschneidung oder der Umlegung des Gummischlauches.

Wo nun die Nath des Uterus absolut sicher hält und ihn auch durch die Bauchdecken hindurch zu massiren und zu comprimiren gestattet, sollte es da nicht auch in verzweifelten Fällen doch noch gerathen sein, den Uterus nicht so leicht aufzugeben? Allerdings kommen auch Todesfälle wegen Atonia Uteri vor, wo derselbe nicht verletzt wurde. Diese sehr seltenen schwersten Fälle von den günstigeren zu trennen, wird hier die Aufgabe sein, die nicht leicht zu lösen ist und mit zu der Frage nach den Grenzen des Kaiserschnittes und der Porro-Operation gehört.

Nach Vollendung der Uterusnath und Berücksichtigung etwaiger Blutung wird der Uterus mit einer nicht zu starken antiseptischen Flüssigkeit gereinigt, die trocken getupfte Nathlinie iodoformirt, das Organ in die Bauchhöhle zurückgebracht und diese ohne Drainage geschlossen. Der antiseptische Verband muss so dünn sein, um die Ueberwachung des Uterus zu gestatten und die Wirkung einer sofort aufgelegten grossen Eisblase zur Geltung kommen zu lassen. Einige Ergotin-Injectionen, welche auch prophylactisch schon während der Operation werden sollen, sind jetzt von grossem Nutzen.

Die *Nachbehandlung*, welche zugleich die einer Wöchnerin und einer Laparotomirten ist, sei so inactiv wie möglich.

Damit wäre ich mit der Schilderung der heutigen Technik des Kaiserschnittes zu Ende. Ich verweilte länger bei ihr als sich für den Rahmen eines Vortrages vielleicht gehört: man wird mir aber gewiss darin beipflichten, dass gerade die technische Seite der Kaiserschnittfrage die wichtigste ist, und wende mich nun von ihr ab mit dem bedauernden Bewusstsein, bei der Fülle zu erörternder Einzelheiten manchen bedeutsamen Punkt unberücksichtigt gelassen zu haben.

Die nächst der Technik des Kaiserschnittes wichtigste weitere Frage ist die nach den *Indicationen* desselben, welche heute von einem doppelten Gesichtspunkte in's Auge zu fassen ist gegen vor 1876.

Erstens haben wir Entscheidung zu treffen, bei welchen Graden von Verlegung der natürlichen Geburtswege, welche die Geburt eines lebenden und lebensfähigen Kindes unmöglich machen, der Kaiserschnitt indicirt sei; zweitens müssen wir abwägen, wann an Stelle des conservativen Kaiserschnittes die Porro-Operation oder eine andere Concurrenzoperation, wie Gastro-Elytrotomie, Total-Extirpation des Uterus, Symphysiotomie, auszuführen sei.

Der Kürze wegen und um der Discussion Gelegenheit zu geben, sich gerade hier frei

zu entwickeln, werde ich die Frage nach der Abgrenzung dieser beiden Indicationen mehr in *Thesenform* zur Sprache bringen.

Man unterscheidet jetzt noch eine *absolute* und eine *relative Indication* zum Kaiserschnitt, deren Bedeutung hier nicht erklärt zu werden braucht. Idealer Weise sollten diese beiden getrennten Indicationen zu *einer* vereinigt werden, folgender Fassung:

Der Kaiserschnitt ist indicirt *bei lebendem Kinde*, wenn dieses durch keine Kindeserhaltende Operation (Zange, Wendung, event. künstliche Frühgeburt, Symphysiotomie) lebend zu Tage gefördert werden kann; *bei todtem Kinde*, wenn dieses durch Zerstückelungs-Operationen (Craniotomie, Embryotomie) überhaupt nicht oder nur unter grösster Gefährdung der Mutter per vias naturales geboren werden kann.

Würden *Busey* und *Jaggard*, welche sich vor einigen Jahren über die vorliegende Indicationenfrage im *American Journal of Obsterics* heftig befehdeten, die vorzüglichen Resultate gekannt und vorausgesehen haben, welche durch den verbesserten Kaiserschnitt erreicht worden sind: sie würden sich wohl versöhnt haben. Laut der jüngsten Zusammenstellung der ersten 50 nach meiner Methode ausgeführten Fälle von Kaiserschnitt ergab diese bei Beckenenge 82.5 % Heilungen. Soweit die Nachrichten reichen, wurde bei absoluter Beckenenge 8 Mal operirt, mit 3 Todesfällen, *bei relativer Indication 28 Mal mit 2 Todesfällen* = 7.1 %, das ist eine niedrigere Mortalität, als sie die bisher besten Statistiken der Craniotomie aufweisen.

Diese Resultate gestatten daher folgende Thesen:

1) *Der Kaiserschnitt ist eine lebenssichere Operation unter folgenden Voraussetzungen:*
   *a*) Abwesenheit jeglicher puerperalen Infection;
   *b*) Frühzeitige Vornahme;
   *c*) Antiseptische Ausführung unter Einhaltung einer den anerkannten Principien folgenden Technik.
2) *Die Craniotomie (Embryotomie) des lebenden Kindes ist, wenn diese Voraussetzungen erfüllt sind, im Princip durch den conservativen Kaiserschnitt zu substituiren.*
3) *Die Craniotomie des lebenden Kindes darf nur durch den conservativen Kaiserschnitt ersetzt werden, als der einzigen Operation, welche den drei zu stellenden Ansprüchen auf Erhaltung der Mutter, Erhaltung des Kindes, Erhaltung der Genitalien, genügt. Die Porro-Operation kommt als Alternative nur dann in Betracht, wenn die Wegnahme der Genitalien besonders indicirt ist.*

Da man annehmen darf, dass die Resultate des Kaiserschnittes in der Folge sich noch weiter bessern werden, so ist nicht zu zweifeln, dass die Operation auch allmälig populärer werde und man dann nicht mehr Schwierigkeiten begegnet, die Einwilligung zu ihrer Vornahme zu erlangen, wie sie sich noch aus jener glücklich überwundenen Zeit herleiten, wo der Kaiserschnitt wirklich die grausamste und gefährlichste Entbindungsart darstellte.

Nun der Kaiserschnitt die ihm gebührende erste Stelle als die "normale", "physiologische" Gastro-Hysterotomie, als diejenige Operation, welche es unter allen Umständen anzustreben gilt, errungen hat, ist es auch leichter, sich mit der *Porro-Operation* auseinanderzusetzen und diejenigen *Indicationen* aufzustellen, welche diese als die "anormale", "pathologische" Kaiserschnitt-Operation geeigneter erscheinen lassen.

Ich halte die *Porro-Operation* für indicirt:

1) Wenn Ableitung der Secrete per vias naturales erschwert oder unmöglich ist: d. i. bei *Stenosen und Atresien der Cervix und Vagina*, oder bei *Verlegung der weichen Geburtswege durch einen nicht dem Uterus selbst angehörigen Tumor.*
2) Bei grösseren Myomen des *Corpus Uteri* (Amputatio Uteri myomatosi puerperalis). Am häufigsten ist der Kaiserschnitt wegen Myom nöthig bei *Myoma retrocervicale et retrovaginale.* Hier ist sowohl die Entfernung des Myoms allein wie die Abtragung des Uterus sammt Myom ungemein gefährlich, schwierig, wenn nicht

unmöglich. Die Abtragung des gesunden Corpus allein ist sinnlos. Hier ist der conservative Kaiserschnitt eventuell in Verbindung mit Castration das richtigste und schonendste Verfahren.

3) *Bei infectiöser Erkrankung des Corpus Uteri* (Endometritis, Metritis, Metrophlebitis septico-puerperalis etc.), eventuell auch bei *infectiöser Erkrankung der Cervix Uteri*, wenn Weiterverbreitung der Infection auf das Corpus Uteri zu fürchten ist, wie in gewissen Fällen von *Carcinoma colli Uteri*.

4) *Bei Schwangerschaft in der verschlossenen Hälfte eines Uterus bicornis*, wo die Abtragung der künstlichen Anlegung einer Oeffnung nach der offenen Hälfte oder der Annäherung an die Bauchwand und Drainage nach Aussen vorzuziehen ist.

Da die zurückgelassene Uterushälfte wieder geschwängert werden kann, so handelt es sich hier um keine echte Porro-Operation. Ich selbst operirte einen solchen Fall, und gebar die Frau noch drei lebende Kinder.

Findet sich übrigens, wie in einem Fall von *Benno Credé*, ein genügend weiter Canal nach der anderen Uterushälfte, so kann doch noch der Kaiserschnitt mit Erfolg vorgenommen werden.

*Noch zweifelhafte, resp. bestreitbare Indicationen für die Porro-Operation sind:*

1) *Osteomalacie. Fehling, Oppenheimer, Kleinwächter, R. T. Harris* nehmen an, dass das Leiden durch die Porro-Operation geheilt, resp. gebessert werde, *Winckel, sen.*, behauptet aber auch seine spontane Heilbarkeit.

Da die Krankheit durch erneute Schwangerschaften unzweifelhaft verschlimmert wird, so kann es wohl gerechtfertigt sein, bei Vornahme des Kaiserschnittes dem vorzubeugen: *hiezu empfiehlt sich aber weit mehr der conservative Kaiserschnitt in Verbindung mit der Castration* als die *Porro-Operation*. Die Wirksamkeit dieser beruht nur auf der Mitwegnahme der Ovarien.

2) Die von *A. Martin* aufgestellte Indication für Fälle, wo "das Puerperium als solches dem Allgemeinzustand der Patientin unverkennbar Gefahren bringt," wie bei Frauen mit schweren Herz- und Lungenkrankheiten, für welche er von Nachblutungen, wie von der puerperalen Involution als solchen Gefahren fürchtet.

Wird die *Besorgniss* vor Nachblutung und nicht diese selbst zur Indication erhoben, so würden Viele ganz unnöthig die *Porro-Operation* ausführen. Wirklich eingetretene und gefährliche Blutungen aus dem vernähten Kaiserschnitt-Uterus sind aber so selten, dass ich sie nicht als besondere Indication aufstelle.

Wieso von der puerperalen Involution Gefahren und höhere Gefahren drohen sollen als von dem Stumpfe des amputirten Uterus, verstehe ich nicht. Das Wochenbett nach gut gelungenem Kaiserschnitt kann weit milder verlaufen, als die langsame, Kräfte verzehrende Reconvalescenz nach der Porro-Operation.

3) *Ruptura Uteri.* Nur so lange das Kind theilweise oder vollständig sich noch innerhalb des zerrissenen Uterus befindet, kann dessen Abtragung nach Entbindung durch den Riss oder durch Schnitt noch als Porro-Operation aufgefasst werden. Liegt die Frucht frei in der Bauchhöhle oder ist sie per vias naturales ausgezogen worden und man trägt den geleerten Uterus ab, so ist dies als "*Amputatio Uteri disrupti puerperalis*" zu bezeichnen.

Relativ die besten Resultate wurden erzielt durch die reine Gastrotomie mit Drainage der Bauchhöhle ohne Nath, ohne Abtragung des Uterus.

Weshalb es nicht möglich sein soll, einen Uterusriss, bei noch nicht in die Bauchhöhle ganz ausgetretener Frucht, durch rationelle Nath wieder zu schliessen, ist nicht einzusehen. Der Erfolg scheiterte eben meist an der Mangelhaftigkeit der Nath, allerdings vielfach auch an schon bestehender Infection, an ausgedehnteren Zerreissungen und Quetschungen, an der vorausgegangenen

Blutung. Der Beweis, dass die Porro-Operation, resp. die Amputatio Uteri disrupti puerperalis Besseres leiste als die Drainage der Bauchhöhle mit und ohne Nath der Risswunde, ist noch nicht erbracht.

Weitere Operationen nach *Porro's* Muster, welche noch anderen Zwecken als denen des Kaiserschnittes als solchen dienen, wären :

1) Der Kaiserschnitt mit Abtragung des Uterus, provisorischer Vernähung des Stumpfes und *vaginaler Extirpation* desselben sammt dem Collum Uteri bei *operablem Carcinom* desselben, *also eine Combination der Porro-Operation mit der vaginalen Totalextirpation des Uterus.* Oder die Combination der *Porro*-Operation mit der Laparo-Hysterotomie von *Freund.*
2) Die *Amputation des puerperalen Uterus wegen Retention der in septischem Zerfall begriffenen und sonst nicht entfernbaren Placenta*, eine Indication, welche nach glücklicher Operation eines Falles von *B. S. Schultze* aufgestellt worden ist.

Damit wäre die Aufstellung von Indicationen für die Porro-Operation, ihre Abarten und Modificationen erschöpft. Die Zahl und Bedeutung derselben ist gross genug, um ihr in dem Wettbewerbe mit dem klassischen Kaiserschnitte ein reiches Feld erfolgreicher Thätigkeit anzuweisen.

Gerade dadurch, dass in der Porro-Operation ein neues Operations-Verfahren entstanden ist, welches die schwierigsten und gefährlichsten Fälle, welche sonst dem Kaiserschnitt allein zukamen, auf sich nimmt, kann dieses sich reiner entfalten als die idealste Form der geburtshülflichen Laparotomie, welche allein im Stande ist, Mutter, Kind und Genitalien zu erhalten, daher allein mit dem schönen Namen des "*Conservativen Kaiserschnittes*" belegt werden kann.

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## ABDOMINAL SECTION FOR THE REMOVAL OF THE FŒTUS.

### SECTION ABDOMINALE POUR L'ENLEVEMENT DU FÉTUS.

### DER BAUCHSCHNITT ZUR ENTFERNUNG DES FÖTUS.

BY WM. H. WATHEN, M. D.,

Of Louisville, Ky.; Professor of Obstetrics and Diseases of Women in the Kentucky School of Medicine, ex-President of the Kentucky State Medical Society, Consulting Gynæcologist to the Louisville City Hospital, etc.

Some months ago I read, in the Obstetrical Section of the American Medical Association, in Chicago, a report of a case of laceration of the uterus, in which I alluded to the subject of Cæsarean section and its modifications, and suggested the substitution of some form of abdominal section as an alternative for embryotomy in all cases where the child is living. I am now convinced of the correctness of this position, and beg to emphasize it in the presence of distinguished authorities from all parts of the world, and to assure you that I assume this position no less from a scientific than from a moral aspect. I cannot believe that our moral sense will justify us in destroying the life of an innocent human being in the interest of the life of another responsible for its existence, and I would welcome the enactment of laws against this practice in all civilized countries. I assumed this position in my papers written six years ago, and entered my protest against embryotomy on the living child ; but I purpose treating this subject

to-day in a purely scientific sense, recognizing that every man is morally responsible for his own acts. Doubtless there are few members present, of extensive experience, who are not personally familiar with, or know by observation of, cases of embryotomy, in which a living child could have been delivered by version or with forceps, and probably by the unaided efforts of nature; or instances where embryotomy had been decided upon, but during the delay occasioned by the refusal of the woman, the family, or the spiritual adviser, to allow the doctor to kill the child, nature triumphed and saved the life of both mother and child. Our statistics of embryotomy are not so thorough or accurate as those of abdominal section, but we have collected data to show that the mortality to the mother is not greater in the latter than in the former, and in the latter the child is presumed to be born alive. But these results depend upon a thorough knowledge of all the scientific facts relating to the mechanism of labor, obstetrical surgery and the management of pregnant women from the time the child is viable until term.

The substitutes for embryotomy are Cæsarean section, improved Cæsarean section, with the deep muscular and the sero-serous multiple suture, Porro's operation, Mueller's operation, or laparo-elytrotomy, as may be indicated in any particular case.

If pelvic contraction be detected during pregnancy, which may often be done, the induction of premature labor is indicated where the conjugate diameter is not less than two and five-tenths inches, the bi-parietal diameter of the fœtal head at seven months being only two and seven-tenths inches, which may be compressed .39 of an inch, thus enabling it to enter the pelvic cavity. If the contraction is not so great pregnancy may continue longer, since the bi-parietal diameter measures at 7½ months 2.9 inches, at 8 months 3.1 inches, at 8½ months 3.3 inches, at 9 months 3.5 inches, and at term 3.7 inches. Premature labor should not be induced in a pelvis with a conjugate diameter of less than 2.5 inches, but in these cases the mortality would not be greater in abdominal section than in embryotomy, if we practice all the modern improvements. It has been shown, by the statistics of Harris, that the mortality of Cæsarean section, in timely operations in country practice in the United States, has not exceeded twenty-five per cent., and in these women the uterine wound was not sutured. Abdominal section should be practiced as an operation of election, and in no instance as a *dernier ressort;* and by the observance of this principle the mortality of the future will not exceed ten per cent. in operations performed after the most approved method applicable to the particular case. No one should perform Cæsarean section without suturing the uterine muscularis and using the sero-serous multiple suture; and recent results have made this the operation of the future, but there will occasionally be cases in which the amputation of the uterus or laparo-elytrotomy will be preferable. Porro's operation is indicated in nearly all cases of rupture of the uterus, in some cases of fibroma of the uterus, and in inflammation of the uterus, or where there is retention of tissue elements in fatty degeneration due to mal-nutrition; or in retention of elements or substances that would poison the blood; such as gangrene, putrid fœtus, etc. In these cases embryotomy could not be successfully performed; so let us compare the general results of embryotomy with the results of the modified Cæsarean section, laparo-elytrotomy being an operation too complicated for general adoption, though invaluable in hospitals and in the practice of expert operators.

De Soyre, in his thesis, gives 52 cases of embryotomy in pelves of less than 2.15 inches, with 31 recoveries and 21 deaths, a mortality of 41.38 per cent. In the thesis of Maygrier there are mentioned 67 cases of embryotomy in pelves from 2.53 to 1.4 inches, with 39 recoveries and 28 deaths, a mortality of 41.79 per cent. Of these cases there were 31 where the pelves measured 2.34 inches at the highest, with 17 recoveries and 14 deaths, a mortality of 45.16 per cent. In the statistics of Rigaud and Stanesco the mortality in 122 embryotomies is given at 38.52 per cent. These are probably the

most accurate statistics available, and it will be observed that the conclusions are relatively uniform. We are sometimes told that the mortality of embryotomy should be insignificant, and occasionally we see statistics which seem to justify this assertion, but the cases operated upon were doubtless women who could have been delivered by the induction of premature labor, or at term unaided, or by version or the forceps. We have reports of 39 cases of improved Cæsarean section, with 27 recoveries and 12 deaths, a mortality of 30.77 per cent. If we exclude 5 cases performed in the United States, when the women were exhausted, we have 34 operations, with 27 recoveries and 7 deaths, a mortality of 20.59 per cent. In Credé's analysis of 26 cases we have 19 recoveries and 7 deaths, a mortality of 26.67 per cent.; but in 3 of these cases septic infection existed before labor, in 2 grave cases it occurred during labor, and in 2 cases the patients died of other complications. There are 23 reported operations in Germany and Austria, with 19 recoveries and 4 deaths, a mortality of 17.4 per cent., but not a single death is referable to the operation. In 16 operations performed in the Maternity Hospital of Leipsic and the Dresden Maternity Hospital, by Sänger, Oberman, Donat, Leopold and Cohn, there were 15 recoveries and 1 death, a mortality of 6.25 per cent. All the children were born living. Lawson Tait proposes to reduce the mortality in the Porro operation to 5 per cent.; then he ought to get better results by the modified Cæsarean section.

It is gratifying to observe that, with the advance in the science of obstetrics, the medical profession recognizes that the field of embryotomy is curtailed, and that the tendency of science is to eliminate this operation on the living child from obstetric procedure. I feel sure that future results will justify its total exclusion, for the progress in abdominal surgery has been greater than in any other department of surgery, and the success in the near future will far surpass that of recent years. But the profession should be taught all the scientific details applicable to successful abdominal surgery, and perform the modified Cæsarean section as an operation of election, and never as a last resort.

When delivery *per vias naturales* is prevented by uterine or abdominal tumors, the alternative to embryotomy is to remove the tumors if it is possible to do so; otherwise the Porro operation is the proper alternative. Porro's operation is indicated in cases of ruptured uterus, if the rent extends through all the coats, whether the child is in the abdominal cavity, the uterus, or has been delivered. If the blood, the bloody serum and the liquor amnii be thoroughly removed from the peritoneal cavity before decomposition or inflammation, the operation offers but few additional dangers and removes many. But the operation should be done immediately, as all the pathological changes are against the late operation. The woman may have recovered from the shock, but adventitious sacs, plastic adhesions, etc., will have formed, will prove troublesome, and will prevent success.

The above justifies the conclusion, that the risk to the mother in timely operations, and in cases of election, in abdominal section for the removal of the fœtus, is not greater than in embryotomy; and when the medical profession is impressed with this valuable truth, mutilating operations on the child will be relegated to their proper sphere, viz.: cases in which the fœtus is dead.

Adjournment at six o'clock.

# THIRD DAY.

WEDNESDAY, SEPTEMBER 7th, 1887.

The President, Professor DE LASKIE MILLER, in the chair.

DISCUSSION.

In opening the discussion, Prof. SIMPSON expressed himself as very largely in accord with the views so clearly formulated by Prof. Lusk and Dr. Sänger, in their able papers, read yesterday, and further illustrated by Prof. Wathen.

He wished to maintain for the obstetrician and the general practitioner the right still, in some cases of difficult labor, to break up the head of the child to save the mother's life. Certainly the cases were few in which the sacrifice of the child's life was demanded, and they were becoming more rare as the sanitary conditions of population improved. In Edinburgh, rickets even was becoming very rare, and as for malacosteon, the only case he (Prof. SIMPSON) had seen for many years occurred, not in a pregnant woman, but in one who suffered from dyspareunia in consequence of the narrowing of the pubic arch. The result was that the indication for any form of head reduction was very seldom met with. But this also narrowed the opportunity for gaining experience in the Cæsarean operation. He had no doubt that the field of application of laparotomy would extend with the application of the conditions under which it can be successfully carried out. It was important in regard to prognosis to differentiate between two groups of cases. In the first, the practitioner did not get the chance of operating till the woman was exhausted, the child might be dead, and dangerous septic processes were already at work. In such cases it sometimes gave the patient the best chance of recovery to open the abdomen and uterus, and without regard to his own reputation, the practitioner finds it his duty to give her that one chance. In the other group of cases the practitioner had the patient under observation before labor set in, and could choose his time and mode of interference. In such cases successful results might almost always be expected. And when Sänger and Leopold had demonstrated the safety of the method with the sero-serous ligature, he (Prof. SIMPSON) believed that most obstetricians would feel themselves constrained to adopt the Sänger method in carrying out the operation. The Porro procedure would still have its application in a few instances, as when the uterus was damaged or the seat of disease; but he thought Prof. Lusk had rendered a good service in impressing on the profession the importance of obtaining clear impressions as to the conditions of safety in Cæsarean operations.

Dr. BALLS-HEADLEY, Melbourne, Australia, said: The main points in this class of cases are a clear diagnosis that the child cannot be born by the natural passages, and a determination to carry out the necessary operation without attempting measures believed to be futile, which consume valuable time, or diminish the expectation of recovery. In these remarks I shall confine myself to conditions of cancer of the cervix and to contractions of the bones.

Some twenty years ago I assisted Dr. Greenhalgh, when, in a case of extensive epithelioma of the os, Dr. Richardson etherizing the line of operation, he performed Cæsarean section. The child and mother recovered, and the epithelioma diminished.

Not long ago I attended a woman already in labor, having a malignant, hard os. I thought that by the nicking of the cervix and craniotomy the child could be delivered. But the nicks split, and, though the child was delivered, the mother presently died. In future I shall invariably advise the removal of the child by Cæsarean section, or, in such a case, the complete removal of the uterus, as advised by Dr. Martin, of Berlin.

As to contracted bones, some twenty years ago I visited a district east of Doep, opposite Bonn, on the Rhine, where many of the women appear to have contracted pelves; as they sit, the bones bend. There the doctor in attendance, whose name I greatly regret I do not remember, showed me very many women, some of whom had had Cæsarean section performed once or twice, and some five or six times, and some who were comfortably looking toward their confinement by this mode, with perfect expectation of success.

At the beginning of this year a dwarf, pregnant seven months, came to me. She was four feet high, and her arms only extended to the brim of the pelvis. The antero-posterior diameter was one inch, and the os could with the greatest difficulty be felt, and was not well developed. At about the ninth month I performed Porro's operation with success, saving the lives of mother and child. The membranes were found to be attached, and, in view of the certain inability of escape of discharges by the os, it is probable that, had the uterus not been removed, the patient would have died. It is a very easy operation; occupied only twenty-five minutes.

Dr. A. Martin, Berlin, summarized his remarks in the following conclusions:—

1. The abdominal operation is indicated when it seems impossible to bring a living child in any way through the pelvis. Take care not to operate too soon.

2. In cases of neoplasmata: myomata, narrowing the canal or endangering the progress of parturition, and carcinomata colli.

3. Other reasons: diseases which show the life of mother and child endangered by the process of parturition and puerperium.

What operation? Cæsarean section, when we can hope that patient can endure another pregnancy, and eventually can undergo another Cæsarean section.

When the character of the tumor, or its site, or the disease, is necessarily fatal, do Porro's operation, or perform total extirpation.

Dr. W. W. Jaggard.—I desire to limit my remarks to the relative indication for Cæsarean section, in cases of diminution of the conjugata vera to 6–8 cm. In these cases it is possible to deliver the child *per vias naturales*, with safety to the mother, after the performance of craniotomy, but it is usually utterly impossible to deliver a living child by version and manual extraction or the forceps. I beg to mention four considerations in connection with the relative indication, which, I think, have not received adequate attention in the papers read.

1. The operation of craniotomy does not require a higher degree of technical skill than it is fair to presume every qualified obstetrician possesses. The operation as performed in Vienna, for example, is not so difficult as the high-forceps operation.

2. When performed before infection, exhaustion or injury of the woman, with antiseptic precautions, adequate skill and good instruments, *e. g.*, Carl Braun's curved trepan and cranioclast, the mortality of craniotomy, as recently remarked by Robert Barnes, is practically nil. (*Beilage zu Nr. 35 d. Wien. Med. Woch., 1886*, p. 1218). In Carl Braun's clinic, during the quinquennium, 1881–1885, craniotomy was performed forty-nine times with eight deaths, a mortality of 16.3 per cent.—a

mortality considerably greater than that observed in Merkel's 100 cases, or Thorn's 80 cases, just now referred to by Dr. Lusk. But then "statistical evidence," as Dr. Lusk wisely remarks, "does not mean bare records of deaths and recoveries, but a careful study of recorded cases, deductions from which are rational, and furnish the safest guide to scientific practice." Such a study of Braun's statistics reveals the fact that the conditions just enumerated were not supplied. The very large majority of the women were brought into the lying-in room of the clinic long after labor had begun, after ineffectual attempts at delivery by forceps; after the infection, exhaustion and injury of the patients. Many died from causes sustaining no necessary relation to craniotomy. During sixteen months' constant attendance at the clinics of Carl Braun and Josef Spaeth, 1881–1883, I witnessed the performance of the operation some twenty-four times, when the conditions were fulfilled, and noted twenty-four uninterrupted recoveries. I have no intention of entering into a critical analysis of the causes of death in the eight fatal cases in Merkel's one hundred craniotomies, but merely wish to mention the facts, in passing, that one woman died of rupture of the uterus, diagnosticated prior to the operation, one died from typhoid fever during the puerperium—facts overlooked in the paper of the gentleman who quoted these statistics.

3. An essential condition to the relative indication for Cæsarean section is the consent of the woman, obtained without direct or indirect coercion. I am under the impression that few American females would prefer abdominal section to craniotomy, if the relative death rates of the two operations were fairly and honestly presented.

4. It seems difficult to escape the conviction that much of the interest in the child's, as compared with the mother's life, under these circumstances, partakes of the nature of sentimentalism, or of the delight experienced after the performance of an arduous scientific experiment. The interest is entirely impersonal, and usually ceases after the fact of the baby's crying has been demonstrated and duly recorded in the presence of competent witnesses. The death-rate during and subsequent to the operation in such infants is very high, and their general expectancy of life is not nearly equal to that of babies of normal birth. The ingenious casuistry by which it has been made to appear that the unborn infant's right to existence, under these circumstances, is equal to, or even greater than, that of the mother, is interesting, rather than convincing.

Dr. J. A. Doléris, Paris, said: It was customary in France to remove the fœtus *per vias naturales* whenever it was possible, even if it was necessary to destroy the life of the child before making the attempt. Statistics abundantly demonstrate that, in France, the maternal mortality of craniotomy, in cases of pelvic contraction of six cm. in the true conjugate, is nil, or almost nil, when ordinary antiseptic precautions have been taken.

He referred to the gravity conferred upon the prognosis in Cæsarean section, when the incision passed through the placental area of the uterine walls.

One important cause of secondary internal hemorrhage arose from uterine inertia. The elastic ligature, applied for too long a period around the lower uterine segment, paralyzes the motor centres of the uterus, and hypodermic injections of ergot under these circumstances are without effect. He recommended, in the place of compression by the elastic ligature, temporary compression with the hands, especially when the placenta was inserted on the anterior wall.

He reported the case, in his own practice, of a woman dying on the second day after the operation, of exhaustion following secondary hemorrhage, the result of uterine inertia. The elastic ligature had exerted pressure only through a period of thirty minutes.

# TRAITEMENT ET RESTAURATION DU COL DE L'UTÉRUS PENDANT LA GROSSESSE.

## TREATMENT AND RESTORATION OF THE CERVIX UTERI DURING PREGNANCY.

## BEHANDLUNG UND WIEDERHERSTELLUNG DES CERVIX UTERI WÄHREND DER SCHWANGERSCHAFT.

PAR J. A. DOLÉRIS.

Ancien chef de clinique, obstetrique et gynecologique, accoucheur des hôpitaux ; membre fondateur de la Société Obstetrique et Gynecologique de Paris.

L'observation principale qui fait le sujet de cette note est assez exceptionnelle pour que j'entre dans quelques détails préliminaires, à l'endroit du traitement des affections du col considéré à un point de vue général, pendant la période de gestation.

### INCONVÉNIENTS ET DANGERS DES LESIONS DU COL DE L'UTÉRUS PENDANT LA GROSSESSE.

1° Que l'inflammation chronique du museau de tanche, les lésions traumatiques, l'inversion, l'ectropion, les érosions papilliformes etc., soient des obstacles à la fécondation, cela n'est pas à prouver ; aussi doit-on s'attendre exceptionnellement à rencontrer chez une femme enceinte des lésions de cet ordre très accentuées. Mais le fait peut s'observer néanmoins ; mon observation en est la preuve.

2° Que la fécondation s'opère souvent dans des utérus porteurs des lésions que je viens d'énumérer, non plus quand elles sont à leur période d'état, mais lorsque ces lésions sont réparées spontanément, ou par les soins du médecin, cela est un règle en quelque sorte ; car, il est peu de femmes qui, après l'accouchement, n'aient plus ou moins à souffrir d'un traumatisme si fréquent qu'on le considère comme constant, la lacération du col, ou d'un trouble fonctionnel, un *catarrhe* simple, ou d'une inflammation réelle, l'endométrite cervicale. La réparation du traumatisme est limitée quand celui-ci, se fait vite et correctement. Le catarrhe guérit seul d'ordinaire par le fait des soins hygiéniques habituels et le retour intégral de l'utérus à l'état normal ; l'inflammation vraie, l'endométrite avec son cortège habituel, la folliculite kystique, les érosions, etc., sont plus rebelles, mais guérissent souvent par les traitements appropriés.

De telle sorte que la gestation survenant en des circonstances telles, que le col n'a pas encore recouvré son intégrité absolue, à une époque plus ou moins éloignée d'ailleurs de la gestation précédente, il n'est pas rare de voir survenir une série de troubles qui sont l'indice et l'effet de la réapparition des lésions. Ces troubles sont : la *douleur*, la *leucorrhée*, parfois *l'hémorrhagie*, et en tout cas un état de malaise qui nécessite l'intervention médicale. Que de fois le médecin n'a-t-il pas cautérisé inconsciemment des érosions, *tolérables* à la rigueur, qui reparaissaient au début d'une grossesse à peine soupçonnée ! Mais que de fois aussi n'a-t-on pas été obligé de passer outre à une crainte d'un avortement, et de traiter sérieusement des lésions véritablement sévères, et menaçantes pour l'avenir même de la grossesse !

Mon intention n'est pas de m'appesantir sur la gravité des conséquences de toutes les lésions cervicales pendant la grossesse.

Je me réserve sur ce point, et ce serait d'ailleurs exagérer que d'y croire aveuglément. Je veux rappeler seulement que le col utérin malade a éte accusé de beacoup de complications gravidiques, réputées sérieuses : *nervosisme exagéré, vomissements incoercibles, névralgies pelviennes rebelles*, entr'autres.

Il doit y avoir beaucoup de vrai dans ces accusations, mais je doute que l'on ait toujours bien mis le doigt sur l'enchaînement étiologique qui préside à l'apparition de

ces troubles. C'est ainsi que l'existence d'un col profondément lacéré, coïncide avec divers déplacements, la rétroversion, l'antéflexion, fréquemment, et ce sont là des anomalies qui sont loin d'être indifférentes, pour la marche de la gestation, mais je veux me cantonner dans mon sujet.

3° Lorsque la lacération double du col est arrivée à un tel degré qu'elle remonte jusqu'aux culs-de-sac latéraux, sur lesquelles elle empiète parfois au point que la portion supra-vaginale du col est elle-même lacérée et affaiblie par une cicatrice insuffisante, on peut dire que du col il ne reste en réalité que l'anneau supérieur, le sphincter interne, tandis que la portion vaginale est totalement divisée en deux lèvres éversées, qui figurent la *gueule de serpent* largement ouverte.

Des lésions accessoires corrélatives existent à peu près constamment dans ces cas, et la description *anatomo-pathologique* si précise, donnée par Emmett, se retrouve généralement dans son intégrité : cicatrices douloureuses, fibromes nodulaires minuscules, aux angles de la lacération : glandes hypertrophiées, kystiques, muqueuse tuméfiée, tendue saignante. Sécrétion purulente. Si l'endométrite préexiste à l'état sub-aigu mal éteint, il y a souvent une exacerbation soudaine à l'occasion de la grossesse qui débute, et la douleur est excessive; les sécrétions sont parfois franchement purulentes au bout de peu de temps.

C'est à tort qu'on traiterait avec légéreté et indifférence des cas aussi caractérisés, car la vie des malades pendant la grossesse leur est rendue insupportable. Ce sont des troubles incessants.

La douleur affecte des formes diverses, tantôt une sensation aigué quasi-constante dans l'un des côtés du bassin, avec des irradiations diverses, soit vers les parois lombo-abdominales, soit vers le siège ou les membres inférieurs. Cette douleur est d'autres fois, sourde et intermittente, mais, quoique supportable, elle obsède la malade d'une façon continue, par la persistance d'une sensation de souffrance vague dans le bassin, dans les intervalles de répit. On peut dire de ces grossesses qu'elles sont caractérisées par le phénomène, douleur. Ce sont de vraies grossesses douloureuses.

Parfois, la douleur s'accroît du fait d'un petit noyau inflammatoire exsudatif para-utérin, au voisinage des zones les plus enflammées du col (paramétrite localisée.)

Dans de telles conditions, l'avortement dans les premiers mois n'est pas rare.

Il n'y a qu'à observer pour s'en convaincre.

J'ai à ma disposition un bon nombre d'observations qui démontrent que de semblables lésions du col, arrivées à un tel degré, au début d'une ou de plusieurs grossesses successives, ont déterminé l'avortement précoce.

Je ne veux citer que deux cas que j'ai observés tout récemment en rappelant que cette notion est déjà très acceptée, presque vulgaire à force de rééditions successives.

OBSERVATION I.

Mme B. de Chouy (*Aisne*), m'est adressée par le Dr *Manichon* d'Oulchy-le-Château, le 8 juin 1887.

"Elle a 40 ans. Réglée à 16 ans, régulièrement pendant huit jours. Leucorrhée légère. Paraît avoir eu des symptômes d'ovarite dès ce moment là. Mariée à 21 ans. Premier accouchement au bout de 2 ans à terme, enfant vivant. Elle se lève le dixième jour. Suites de couches pathologiques par des abcès au sein. Enfant volumineux. Rétablissement des menstrues régulier. Pas d'accident, 5 ans après nouvelle grossesse. Deuxième grossesse : phénomènes douloureux au côté droit du ventre, elle reste au lit près de 6 mois, pertes blanches. Accouchement *prématuré* de 6 mois. L'enfant vit 9 jours. Suites pathologiques, fièvre, 18 mois après, péritonite (?) Huit à dix jours de lit. Sangsues.—Spéculum. On découvre au col ce qu'elle avait aux mains, au nez, (métrite cervicale aigue, glandes purulentes.)

"Aprés un traitement local, rétablissement. Troisième accouchement, 3 ans après

la 2e péritonite (fausse couche à 3 mois). Trois mois après cette fausse couche, quatrième grossesse suivie d'une fausse couche de six semaines (?) Un an après cinquième grossesse (?) Nouvelle fausse couche de six semaines, sixième grossesse, 18 mois après ; la sixième grossesse arrive cette fois à terme, grâce à un repos constant et aux soins incessants dont la patiente est entourée. Ce dernier accouchement a eu lieu il y a trois ans et demi. Accouchement normal, suites : abcès aux seins.

"Au mois de novembre 1885, après une longue période de malaises avec douleur toujours à droite, nouvelle atteinte d'inflammation abdominale (péritonite?). Repos au lit. Sept sangsues. Vésicatoire abdominal. Amélioration au bout de deux mois. Trois atteintes d'inflammation abdominale à la fin de décembre 1886, au commencement et à la fin d'avril, 1887.

"État nauséeux dans l'intervalle. Nervosisme habituel. Leucorrhée. Constipation. Sentiment de lourdeur, tiraillement. La malade dit avoir la "sensation d'être ouverte" aprés la fatigue. Mictions trés fréquentes, plus fréquentes avant et pendant les règles.

"*État actuel.*—Organes génitaux externes bien. Périnée mince et affaibli. *Décubitus dorsal :* Les efforts n'entraînent pas la muqueuse vaginale. Cystocèle. Col : Double éversion, lacération double, profonde. Hypertrophie énorme des deux lèvres. Orifice interne très ouvert. Toute la cavité cervicale est remplie de polypes glandulaires comme si elle était semée de grains de chènevis. Le doigt passe aisément. Hystérométrie, 8 centimètres, jusqu'à l'orifice fictif. Leucorrhée accentuée. A l'examen, il sort un paquet de glaires. Prolapsus.

"J'ai opéré cette malade et j'ai réussi à ramener l'utérus à des conditions parfaites.

"Mais j'insiste sur le sort fâcheux qui a été fait aux organes de la reproduction par la lésion invetérée du col, qui fait le principal objet de ce mémoire. Quatre fausses couches ; complications de tout ordre, à deux grossesses dont la deuxième a été une période de craintes perpétuelles, de souffrances et de repos forcé. Tel est le bilan. Le fait se passe de commentaires."

OBSERVATION II.

"Mme R. a eu un premier enfant il y a six ans. L'accouchement a été court, douloureux, suivi d'une hémorrhagie.

"*Suites pathologiques.*—Depuis, la malade, mal examinée est traitée pour une myélite, alors qu'il ne s'agit que de troubles pelviens graves, qui tiennent à une lacération double du col, et probablement à un renversement de l'utérus en arrière, que j'ai découvert récemment.

"État nerveux très accentué. Elle a fait deux fausses couches, dont la dernière remonte à deux ans. Elle devient enceinte pour la quatrième fois l'année dernière. Je la vois au quatrième mois de cette grossesse.

"Douleurs constantes, névralgies pelviennes et crurales, maux de reins, pertes, spasmes et crises nerveuses. La grossesse est pénible à l'excès. Il y a des périodes de souffrances qui clouent la malade au lit pour deux ou trois jours. Ce sont de véritables coliques utérines.

"L'examen me revèle la lésion cervicale, que je viens de dire, mais point de rétroversion. Parametrium, vaguement empâté et douloureux, sécrétion purulente abondante venant du col et du vagin. Eversion complète en gueule de serpent ; glandes énormes aux angles des déchirures, masses indurées cicatricielles à l'angle de la déchirure du côté gauche, la plus profonde, qui paraît dépasser même le vagin.

"J'ai ordonné le repos, j'ai usé de lavages et de topiques; j'ai ouvert les follicules un fur et à mesure de la réapparition de l'inflammation, ou du redoublement de la douleur. Hydrothérapie continuelle. Bref, j'ai suivi cette grossesse avec des transes perpétuelles, J'ai vu la malade huit et dix fois dans un mois : Je puis dire que je me suis tenu à

quatre pour ne pas intervenir chirurgicalement et terminer une bonne fois par le restauration intégrale du col.

"Je l'avoue, je n'ai pas osé, tant la malade me paraissait susceptible et énervée. Je ne me suis pas décidé non plus, parce que déjà la première moitié de la grossesse était dépassée, et enfin parce que finalement la patience et la constance des soins ont fini par sauver la situation. Mais je me demande si la malade avait été livrée à elle-même, ce que la grossesse serait devenue, or, je dois dire que plusieurs fois je hasardai le mot d'opération et, par exception, je trouvai la femme aussi bien que le mari prêt à tout, tant la situation était par moment insupportable. Je n'exagère rien. Durant tout le dernier mois, l'anneau sphinctérien du col seul retenait la tête fœtale. Le doigt touchait directement la tête sans trouver un canal cervical. L'accouchement s'est fait un peu prématurément à huit mois ½ environ.—Le travail a affecté une marche assez singulière, la période de dilatation a commencé le matin vers 9 heures, et une fois l'orifice arrivé à la dimension d'une pièce de deux francs, la chose est restée en l'état. Arrêt absolu des contractions. A minuit moins un quart, les douleurs ont repris. Il y a eu *deux contractions*, sans plus ni moins. En moins de cinq minutes la dilatation s'était brusquement complétée, la tête avait franchi le col et la vulve. Tout était terminé.

"J'ai touché pour voir sur quel côté du col la nouvelle déchirure avait porté. C'était justement sur le côté droit et non point à gauche comme je l'avais prévu, sans y réfléchir sérieusement.

"J'ai dit que le côté gauche du col était en effet lacéré profondément et infiltré de tissu inodulaire. Je pensais que ce tissu au cours de l'ampliation du col céderait, tandis que ce fût le côté droit, beaucoup moins induré et moins profondément déchiré qui, après s'être laissé étirer et distendre progressivement céda cette fois, au moment des deux dernières et uniques contractions.

"Un mois après et plus tard encore j'ai trouvé la forme pathologique du col et j'ai constaté, ce que je n'avais pas soupçonné, un rétroversion qui certainement était antérieure à la grossesse et qui avait dû se réduire spontanément, avant mon premier examen. Cette rétroversion avait été constatée peu avant la dernière conception par Gallard."

### THÉRAPEUTIQUE DES LÉSIONS DU COL PENDANT LA GROSSESSE.

Le fait étant largement acquis, non seulement des inconvénients graves, mais aussi du danger de la métrite cervicale compliquant les lacérations profondes du col pendant la gestation, il en découle qu'à ces lésions il *faut obvier d'une manière efficace.*

*a. Traitement des Lésions Legères.*—Il est acquis aussi, que les formes atténuées, les inflammations modérées, les traumatismes légers méritent une attention scrupuleuse et que l'on a tout intérêt à s'en préoccuper pendant la grossesse, de façon à éviter des complications pour l'accouchement où pour les suites de couches.

J'ai expérimenté longuement cette thérapeutique spéciale des lésions cervicales de l'utérus pendant la grossesse ; j'en use avec une sécurité parfaite et avec des résultats excellents.

J'ai confié à un de mes élèves le soin de coordonner les faits qui ressortissent à cette étude et j'espère que la démonstration portera ses fruits.

La base de cette thérapeutique légère est la nécessité de supprimer d'abord les troubles génitaux quels qu'ils soient pendant la gestation ; ensuite d'assainir le terrain où doivent se passer les divers actes de la parturition, de purger les voies génitales de tout élément inflammatoire, de toute excrétion anormale. C'est là le fond de la prophylaxie puerpérale.

Sans empiéter sur les conclusions du mémoire à intervenir, je puis dire que les irrigations de sublimà en solution, des tampons d'iodoforme, de glycérine créosotée, etc., m'ont toujours été d'un secours exactement efficace. Les écoulements purulents se sont

taris rapidement, la douleur a parfois été atténuée et le gonflement congestif du col a cédé.

C'est par ces procédés d'une bénignité incontestable que j'ai débuté dans la voie de la thérapeutique utérine pendant la grossesse. Ils n'ont d'ailleurs rien de bien redoutable. Si on se rappelle que Bennett cautérisait toutes les érosions qu'il rencontrait sur le col des femmes enceintes, les irrigations, les tampons paraîtront des modes d'intervention autrement anodins. Longtemps je m'en suis tenu à ces moyens.

Plus tard, de cas se sont présentés qui réclamaient une intervention plus active et sur lesquels se sont épuisées toutes les ressources du traitement que je viens d'esquisser. Il était nécessaire d'intervenir chirurgicalement.

J'ai sous les yeux une série d'observations recueillies en 1884 et 1885 dans lesquelles il est question de femmes enceintes de quatre, cinq, six et sept mois, qui étaient tourmentées par une abondante leucorrhée et des maux de reins ; des douleurs violentes parfois, et chez lesquelles j'ai découvert sans peine que la source de ces troubles était l'existence de kystes glandulaires enflammées, tantôt sur la face libre des lèvres éversées du col, tantôt à l'angle même de lacérations anciennes, comblées par des nodules cicatriciels hyperplasiés et douloureux.

J'ai ouvert toujours sans danger les kystes de cet ordre et j'ai soulagé les malades d'une façon presque constante. Je sais bien que les œufs de Naboth, les kystes de la muqueuse interne du col sont considérés comme indolores et j'accepte que souvent ils ne causent guère de gêne. Mais je puis affirmer que ceux qui sont profondément logés dans les masses inodulaires des cicatrices cervicales sont quelquefois horriblement douloureux. Ils le sont au début de la grossesse, ils le sont à la fin. Ils occasionnent parfois un redoublement de souffrance au cours du travail ; et même après l'accouchement ils entretiennent des névralgies pelviennes très pénibles. J'en ai observé des cas nombreux dont un tout récent chez la fille d'un de nos confrères.

De toute façon, si l'on doutait que les kystes glandulaires, véritables lésions pathologiques, ce qu'on oublie trop, puissent amener des troubles par le fait de leur siége seul, on ne saurait nier qu'ils entretiennent où qu'ils soient une sécrétion anormale, source de danger de gêne, et on ne peut non plus se refuser à admettre que l'inflammation s'empare d'eux parfois, auquel cas on a non plus une glandule nette, transparente, perlée, mais bien une sorte de tumeur enflammée, rouge, turgide, douloureuse, pleine de pus, un véritable furoncle du col. J'ai vu quelques cas de ce genre, et je les ai toujours soulagés d'abord par l'incision et guéris ensuite par l'entretien d'une médication topique assidue.

Mais je viens de parler seulement de kystes à ouvrir, de cols à sacrifier, de folliculites véritables à inciser, conclusions qui sont l'expression de ma propre pratique, et des objections sérieuses me paraissent difficiles à faire à une telle manière d'agir. J'arrive à des interventions plus décisives.

(*b*) *Traitement de Lésions Intenses.*—En présence de troubles persistants, dont la cause git dans la déformation du col et dans son cortège de lésions, lorsque la médication topique, légère d'abord, puis les ponctions, les scarifications, les incisions, etc. n'ont pas réussi à calmer les désordres existants ; lorsque ces désordres sont une souffrance continuelle pour la femme, et une menace pour la gestation, je ne vois pas de raisons sérieuses pour ne pas intervenir chirurgicalement d'une maniére plus radicale.

Je sais que les classiques sont contre ma proposition et que toute intervention opératoire sur la femme enceinte leur paraît redoutable. Je n'ai qu'à jeter les yeux sur les conclusions émises au sein de la Société de chirurgie il y a peu d'années.

Je sais que les plus osés approuvent les opérations pratiquées loin de l'utérus, s'abstiennent d'intervenir dans la zone génitale.

Cette prohibition touche donc le col, au premier chef, puisqu'il est dans sa portion

supra-vaginale surtout, le foyer de sensibilité réflexe le plus exquis, ainsi que l'ont démontré les recherches de Vulpian et de Dembo.

Mais ces doctrines ont reçu de rudes atteintes. Je possède dans mes cartons de nombreux cas d'intervention opératoire dans la zone génitale qui n'ont rien amené de fâcheux.

Au cours de mon clinicat à la faculté j'ai provoqué l'ouverture large d'un phlegmon iliaque profond qui a été pratiquée par le professeur Richet. Ce phlegmon était juxta-utèrin. Le seul résultat a été le soulagement de la malade, le relèvement des forces, la cessation de la fièvre et un grossesse qui paraissait menacée par un état général et local sérieux a pris une allure tout à fait tranquille et normale.

Dans un autre cas, publié en collaboration avec M. Charpentier, cas où il était question de vomissements incoercibles, une uréthrocèle suppurée a été incisée et drainée par M. Périer sans résultat fâcheux, sinon la diminution d'abord et la cessation ensuite des vomissements. Sur la même femme la dilatation du col par la méthode de Copeman avait été poussée très loin sans nuire à la grossesse, mais sans guérir les vomissements.

Copeman lui-même qui a proposé la dilatation totale du conduit cervical dans les cas de vomissements incoercibles, a bien souligné ce fait, que la dilatation du col n'amenait pas l'expulsion du produit, ce qu'il considère comme un double avantage en faveur de sa méthode.

Et puis enfin la question est jugée aujourd'hui: on ampute et on doit amputer le col entaché d'épithélioma, chez la femme enceinte; Il n'y a aucun profit à attendre de l'expectation. L'opération a été faite maintes fois pour prévenir une aggravation rapide du mal et cela sans péril pour la grossesse.

On fait l'ovariotomie pendant la gestation sans compromettre l'avenir du fœtus. Tous les jours les cas s'accumulent on extirpe à l'avance les fibromes utérins gênant pour l'accouchement et on ne nuit point à la marche physiologique de la grossesse. Schroeder, un des premiers, a donné l'exemple; beaucoup ont suivi. Hofmeier dans un récent mémoire, a fait le compte de ces interventions. On se demande après cela comment et pour quel motif les maîtres de la chirurgie française ont pu opposer un veto formel à toute intervention chirurgicale pendant la période de gravidité. D'où tiraient-ils leurs raisons, leurs preuves?

Le réflexe nerveux qui va de la sphère génitale intéressée par le couteau aux centres moteurs de l'utérus est-il ou n'est-il pas éveillé par le choc traumatique?

L'est-il?...Je l'ai cru, je le crois encore un peu, mais plus je vais, je l'avoue, et moins je suis disposé à accepter cette doctrine sans examen. Je me rappelle trop l'histoire classique de cette servante mise à mal par un maître brutal qui la faisait monter en croupe avec lui et la jetait violemment de son cheval à terre, par diverses fois, afin de la faire avorter, sans cependant y réussir. Je me dis que si souvent la cause de la fausse couche ou de l'accouchement prématuré nous échappe souvent, par contre nous voyons la grossesse résister aux traumatismes les plus évidents en dehors même des traumatismes opératoires.

D'où je conclus, non pas d'une façon absolue, mais avec réserves, que l'ostracisme porté contre les interventions chirurgicales pratiquées pendant la grossesse n'a pas été entièrement justifié, ou du moins, on n'a pas encore mis le doigt, sur le point capital qui doit décider de l'action ou de l'intervention.

En un mot, je me base ici sur des statistiques modernes et sur des faits relatés avec conscience et détail pour estimer que l'intervention opératoire pendant la grossesse où qu'elle porte, est moins dangereuse par elle-même que par les complications septiques qui ne manquaient presque jamais de l'accompagner autrefois, mais qui aujourd'hui sont aisément conjurées.

Le danger de la chirurgie pendant la grossesse comme après l'accouchement, c'est la marche anormale de l'opération; c'est la fièvre, c'est le frisson, c'est l'érysipèle, c'est la

lymphangite, c'est le pus, c'est l'infection, en un mot. Or, autrefois, ces désordres constituaient la *règle*, et il en était ainsi à l'époque où l'on discutait à la société de chirurgie. Aujourd'hui ils sont l'exception. Les faits ne sont pas contradictoires, mais les conditions ont changé.

Ce que je dis ici, m'est inspiré par les faits seuls et le raisonnement basé sur l'induction, mais non point par l'induction. On ne peut nier que la chirurgie *per partum* et *per puerperium* donne des résultats qui furent avec la tradition ancienne. L'ovariotomie pendant la grossesse, la restauration immédiate du col et du périnée pendant les suites de couches ont conquis leur place au rang des interventions licites et utiles.

Ce plaidoyer n'est point pour nier les dangers et les inconvénients des interventions inutiles; bien au contraire, je pense qu'il y a des règles auxquelles il convient d'obéir, et des pratiques qu'il faut absolument rejeter.

En principe, le médecin doit mesurer surtout la quantité de danger que comporte le mal livré à lui même, comparativement à la quantité de danger que comporte le fait de l'opération. Il me paraît évident que le fait de la dent qu'on arrache, surtout si on a soin de l'insensibiliser auparavant, est moins préjudiciable à la marche de la grossesse que la névralgie dentaire qui rend insupportables le jour et la nuit de la femme enceinte.

Je crois plus légitime d'ouvrir un abcès qui empoisonne l'organisme de la malade, que de laisser la suppuration s'ouvrir spontanément une voie, mais trop lentement, pour la sécurité de la mère et du fœtus.

De même je ne marchande pas la thérapeutique interne quand elle s'addresse aux affections dangereuses pour la grossesse, la mère ou l'enfant. Quoi qu'on ait dit et qu'on dise des propriétés abortives du sulfate de quinine ou de l'iodure de potassium, je ne crains pas de les administrer largement contre les accès palustres, et l'hyperthermie ou contre la syphilis. Le danger me paraît bien plus dans la maladie que dans le remède.

Ainsi fais-je pour la thérapeutique externe. Laissant cette diversion, je reviens à la pratique qui consiste à porter son attention au col de l'utérus malade pendant la grossesse et à lui appliquer les principes que je viens d'expliquer en courant.

Je pense donc que les pratiques chirurgicales qui visent la restauration du col sont indiquées lorsqu'elles vont à l'encontre de danger que ces lésions font courir à la grossesse.

Je pense que l'opération d'Emmet peut être, dans certains cas, non un péril mais une véritable sauvegarde pour la gestation.

Je crois que l'avortement est plus sûrement évité par l'intervention que par la négligence volontaire des lésions qui travaillent à le provoquer.

Je ne crois pas autant à la bénignité des cautérisations au fer rouge que l'on pourrait être tenté de substituer au bistouri ; et j'ai la preuve en main que des avortements ont été provoqués par cette sorte d'intervention et j'ai vu des faits de ce genre et j'en ai fait mon profit. Depuis longtemps je me suis habitué à la crainte du cautère actuel porté sur l'utérus, en général, et spécialement au début d'un gestation soupçonnée ou méconnue.

Si donc je possède des faits positifs contre cette manière d'agir, je puis avancer que je n'en ai pas de personnels, du moins, contre celle que je sors de défendre.

Ma réserve étant bien établie, il me reste à parler du fait principal de ce travail.

Observation.—Dans un cas qui remonte à l'année 1884 j'ai risqué l'ablation au bistouri d'un nodule douloureux situé à l'angle d'une cicatrice du col.

"Il s'agissait d'une II pare de 24 ans. La grossesse datait de cinq à six semaines, à compter des dernières règles (il est à remarquer que c'est dans les premières semaines de la gestation que le traumatisme du col compliqué d'inflammation chronique se révèle par des phénomènes douloureux et des sécrétions anormales). La malade souffrait

beaucoup dans les reins, le bassin, à la cuisse gauche, et avait une leucorrhée jaune-verdâtre, abondante.

"Il y avait comme symptôme réactionnel plus sérieux, des douleurs abdominales que la malade comparait à des coliques, mais qu'il était impossible de caractériser cliniquement d'une façon nette.

"A l'examen au spéculum, je trouvai les lèvres du col en éversion et une cicatrice douloureuse faite de trois nodules rouges et saillant sur l'angle d'une déchirure assez profonde qui siégeait du côté gauche.

"La pression de l'extrêmité d'une pince réveillait des douleurs vives.

"Le doigt sentait à peu de distance au niveau de cul-de-sac latéral gauche connexe au col un noyau peu volumineux dur, résistant, douloureux aussi, qui représentait à n'en pas douter une petite masse exsudative paramétrique juxta-utérine a la base du ligamen large.

"La muqueuse interne des lèvres éversées était rouge, parcheminée, facilement saignante.

"Après une semaine de traitement par les irrigations au sublimée l'entretien d'une asepsie constante au fond du vagin, grâce à des tampons de glycérine créosotée à 1 pour 10, le noyau paramétritique disparut, et la sécrétion du col paraissait dépourvue de propriétés septiques.

"Je me décidai à enlever au bistouri toute la masse nodulaire cicatricielle et comme la plaie saignait un peu je plaçai sans difficulté, un point de suture au catgut. Tamponnement de gaze iodoformée, repos absolu.

"Huit jours après la coaptation était parfaite et les douleurs avaient disparu du même coup, et le traitement consécutif aidant, les autres symptômes disparurent.

"Cette femme accoucha à terme et durant les suites immédiates de ma petite opération, je n'observai aucun phénomène insolite. Sans certitude absolue de sa grossesse, je ne la soupçonnais pas moins et si je n'éprouvai pas de craintes exagérées de côté, je n'en étais pas moins très perplexe les premiers jours. Rien ne justifia mes prévisions alarmistes."

OBSERVATION III.

Cette observation appartient à M. Julliard. Elle a été publiée dans le n° de ce septembre 1886 des *Nouvelles Archives d'Obstétrique et de Gynécologie*. L'opération d'Emmet a été faite en ignorance de cause et la grossesse n'était pas soupçonnée. Voici le fait résumé.

"Mme D..., âgée de 27 ans, V. pare, pas de fausses couches, vient à la Polyclinique de l'université de Genève en 7 janvier 1885.

"*Etat général :* difficulté de la digestion, douleurs épigastriques et gonflement de l'estomac après les repas ; un peu de dyspnée et des palpitations ; traits tirés, yeux creux, en un mot, facies utérin. Maux de têtes fréquents, névralgies lombo-adominales. Amaigrissement considérable, chloro-anémie, hystérie prononcé.

"*Etat local.*—Endométrite cervicale, déchirure bilatéale du col utérin suivant le diamètre O. J. G. D.; ectropion des deux lèvres, rétroversion prononcée de l'utérus.

"H. Redard propose à la malade le trachélorrhapie. L'opération est faite par M. Vulliet le 20 février.

"*Opération.*—Selon le désir de la malade, pas de narcose. La patiente est dans le décubitus dorsal. Le champ opératoire est lavé avec une solution de sublimé au 0.001.

"1° Abaissement du col jusqu'à la vulve, une pince sur la lèvre antérieure et une pince postérieure. On opère ainsi comme à ciel ouvert.

"2° Avivement des parties au bistouri. Les lambeaux comprennente toute la muqueuse et le tissu cicatriciel.

"3° Suture au fil d'argent, deux points de chaque côté.

"*Pansement.*—Lavage au sublimé à 0.001 tampon d'ouate iodoformé que l'on renouvelle tous les deux jours.

"*Suites.*—Quelques coliques utérines le jour même, l'aménorrhée fréquente et d'une durée de plusieurs mois, la métrite chronique avaient masqué au chirurgien et à la malade la grossesse.

"*Le 5 mars.*—On renouvelle le pansement. La réunion est parfaite.

"La malade est envoyée à la campagne. Amélioration générale et locale plus de catarrhe cervical.

"Mais apparition de tous les troubles de la grossesse.

"Les premiers jours de mai la malade est revue par M. Vulliet qui constate une grossesse de 4 mois ½ environ. La malade était donc grosse de deux mois au moment de l'opération. Grossesse et accouchement naturels, dilatation régulière, suites de couches normales.

"Examen de la malade 7 mois après l'accouchement. On ne constate aucune déchirure ni ancienne ni nouvelle, pas d'endométrite cervicale."

### OBSERVATION IV.

(*Rédigée par Mme D. Schultz.*)

*Lacération double.—Cicatrice douloureuse.—Endométrite.—Début de grossesse.—Douleurs et menaces d'avortement.—Trahélorrhaphie par l'opération.*

"Mme C..., Institutrice, 27 ans, est amenée à la clinique du Docteur Doléris, par le docteur Duchastélet, le 7 juin 1887.

"Elle a été menstruée à 14 ans et demi, régulièrement tous les mois pendant cinq jours. Menstrues peu abondantes, mais douloureuses. A 19 ans, fièvre muqueuse. A 22 ans, rapports conjugaux. A partir de ce moment, leucorrhée très légère.

"Enceinte au bout de six mois. La leucorrhée s'accentue pendant la grossesse qui est d'ailleurs facile et normale.

"Accouchement normal en octobre 1886, à terme, d'un enfant vivant assez gros, présentant le sommet.

"Durée du travail, douze heures.

"Suites normales. Se lève au bout du dixième jour. La leucorrhée non-seulement persiste, mais augmente d'une façon considérable, la malade est obligée de se garnir. Rétablissement des menstrues, deux mois après, d'une façon régulière et l'écoulement n'est pas plus abondant qu'autre fois, mais les douleurs dysménorrhéiques persistent. Dès son lever la malade ressent une douleur aigue, lancinante à gauche. La douleur s'exagère à la marche, par la station debout, le coït. Trois mois après l'accouchement, en dehors de la leucorrhée et de la douleur signalée, la malade s'aperçoit de la tuméfaction de la grande lèvre gauche, en même temps qu'elle est douloureuse. Le Docteur Duchâstelet médecin traitant magrostique une bartholinite; ouverture au bistouri. Cataplasms. Poudre de bismuth et d'acide borique cristallisé. Injections boriquées. Au mois de mars (le 22) dernières règles. Depuis aménorrhée (?) Coliques, vers le 22 avril pas de pertes de sang.

"Le 22 Mai, pas de coliques, mais, pendant un jour, écoulement d'eau rosée.

"Le 5 Juin, la malade se présente à la clinique, conduite par le Docteur Duchâstelet, ne pouvant pas supporter la douleur du vagin, l'abondance de l'écoulement en blanc et inquiète de l'aménorrhée.

"*Etat actuel*, 7 juin.—Déchirure double du col.

"Cicatrice nodulaire à l'angle de la lacération du côté gauche (amincissement de la paroi utérine du même côté). La cicatrice est douloureuse, le point douloureux se limite non-seulement à l'extérieur par une saillie perçue par le doigt, mais aussi par l'introduction, le contact d'un instrument.

"*Endométrite* cervicale chronique.

"*Antéflexion* très marquée.

"*Eversion* et *érosion*.

"On ne fait pas l'hystérométrie, crainte de grossesse.

"En effet, le corps de l'utérus est volumineux soit par le fait de l'état que l'on soupçonne, soit par le fait d'une métrite. La muqueuse génitale tout entière est tomenteuse, bleuâtre. *Le col est mou ;* la muqueuse cervicale a un aspect fongueux.

"Les sécrétions sont très abondantes. Catarrhe muco-purulent. Glande vulvo-vaginale gauche indurée ; d'après le Docteur D. ces lésions auraient une origine gonorrhéique.

"Le 8 Juin.—On fait une injection vaginale, on met un tampon à la glycérine iodoformée.

"Le 9 Juin.—Même traitement. L'utérus est toujours gros mais cylindrique, ce qui est un argument de faible valeur c'est vrai, mais réel néanmoins, contre l'idée d'une grossesse commençante.

"La question se pose entre l'intervention ou l'expectation en présence d'un début de grossesse soupçonnée. En cas de nêgative l'indication est formelle. Il faut agir. En cas de réalité de la grossesse, la question est entre la somme des chances d'avortement du fait des lésions d'une part : *lacération double, profonde douloureuse* du col ; douleur péri-utérine, utérine, ovarique et irradiations dans la cuisse; endométrite; antéflexion exagére, relâchement et affaiblissement des parois du trajet cervical, surtout à gauche, du fait des cicatrices et de l'inflammation autant que de l'amincissement pathologique de ces parois, enfin sécrétions septiques...—et, d'autre part du fait de l'intervention opératoire. Se basant sur les cas connus où l'avortement ou bien l'accouchement fréquent, prématuré, et à leur défaut une grossesse exceptionnellement pénible ont été la conséquence de semblables lésions, M. Doléris adopte en principe l'opération, convaincu que le traumatisme sera moins à redouter ou tout au moins peut supporter le parallèle avec les éventualités précédentes. Néanmoins, on se contentera d'abord d'un traitement préparatoire antiseptique et en cas d'opération on se tiendra surtout en éveil sur les nécessités d'une hémostase bien conduite.

"Jusqu'au 15 juin, pas de modification sensible. L'utérus ne semble pas augmenter d'une façon visible. Les seins ne présentent rien de particulier. La malade n'accuse qu'un peu d'inappétence et des coliques utérines assez fréquentes. Peut-être a-t-elle intérêt à dissimuler. Le traitement consiste en injections de sublimé et en tampons imbibés de glycérine iodoformée et en insufflations de poudre d'iodoforme dans le conduit cervical. Sous cette influence, la muqueuse paraît se modifier et les sécrétions semblent diminuer. Toutefois la muqueuse intra-cervicale conserve son aspect fongueux et grenu qui dissimule la disposition des plis normaux de l'arbre de vie. Sa coloration est rouge-vineuse et elle saigne facilement.

"Pour atténuer l'importance de l'intervention, M. Doléris pense à un avivement préparé par des cautérisations.

"15 Juin.—Cautérisation au nitrate d'argent (crayon) pur, figurant de chaque côté l'avivement d'Emmet. Repos. La malade souffre un peu dans la soirée.

"Le 16.—Pansement après constatation de l'insuffisance de l'avivement.

"Le 17.—Cautérisation bi-latérale analogue à la précédente, mais fait avec de l'acide nitrique fumant, sur le conseil du Dr. Sevastopulos qui a obtenu de bons effets de cette manière de procéder. Repos. Rien d'anormale.

"Le 18.—*Opération Assistants :* MM. les Drs. Nitot, Desnos, Sevastopulos, Maritan, Duchâstelet, Villa, Cavasse.

"La malade est *anesthésiée* à l'aide du *chloroforme* non précédé d'injections de morphine: vagin irrigué, utérus modérément abaissé. Chaque lèvre est fixée par une pince à traction. Les eschares dures à l'acide nitrique sont encore en place. Mais le

grattage des parties escharifiées destiné à préparer l'avivement montre qu'au dessous il existe encore une couche de muqueuse malade grenue, fongueuse, inégale, qui ne permettrait point de compter sur une réunion certaine. Dans ces conditions, M. Doléris pratique l'avivement au bistouri ce qui donne des surfaces saines, unies et permet l'ablation de masses cicatricielles situées aux angles des déchirures. Pour éviter la perte de sang, l'opération est faite d'àbord du côté droit, et trois sutures posées immédiatement, allant de la base à la pointe du col (sutures à la soie). L'avivement est ensuite pratiqué du côté gauche ; un noyau fibreux cicatriciel, volumineux, est enlevé de ce côté, trois points de suture sont pratiqués avec la soie. L'étendue de l'avivement est en longueur de trois centimètres et en largeur, d'un centimètre au moins pour chaque lèvre. La suture une fois terminée, le col présente sa forme normale un peu pointu, avec un orifice de sept à huit millimètres de dimension transversale. On la réduit encore par l'adjonction d'un point supplémentaire à droite, près de l'extremité.

"Pansement : iodoforme sur le col. Gaze iodoformée dans le vagin.

"*Durée* en tout, quinze minutes. La perte de sang a été très modérée contrairement à toutes les prévisions. Il n'est pas certain que les cautérisations préalables n'aient pas été pour quelque chose dans cette éventualité favorable. L'avivement et la suture immédiate pratiqués de chaque côté, successivement, ont également aidé à ce résultat.

"Après l'opération la malade est portée dans son lit. On fait une piqûre de morphine pour prévenir les mouvements intempestifs de l'utérus. Pas de vomissements. Quelques douleurs lombo-abdominales très légères. On répète la piqûre de morphine le soir.

"Le 19 Juin.—Etat général et local, excellent. La malade a bien reposé.

"Le 20 Juin.—Etat général et local toujours excellents. La malade mange.

"21-22.—B.

"23.—Au soir, un peu de douleur abdominale (constipation) (?) une injection hypodermique, tout rentre dans l'ordre.

"25.—La douleur était bien causée par la constipation.

"La malade a été purgée et aujourd'hui elle va bien. On retire les fils du col. Tout est bien. La turgidité gravidique des tissus rend l'ablation des fils plus difficile.

"Le 29.—La malade va très bien — elle se lévera demain. On change la gaze iodoformée. Le 30 *Juin*, la malade s'est levée.

"Le 4 Juillet.—A l'examen local on trouve l'utérus dans de parfaites conditions de restauration. Les deux lèvres du col sont affrontées jusqu'á l'extrémité. L'orifice externe laisse suinter un mucus clair discret. De chaque côté de l'orifice externe existe un sillon peu profond; ils indiquent la ligne de réunion bi-latérale du col et accentuent sa forme bi-labiée. L'utérus est en antéflexion légère et peut-être un peu abaissé vers le vagin ce qui tient à un léger degré de prolapsus consécutif à la première grossesse. L'utérus remonte au niveau d'une ligne fictive qui séparerait également la symphyse de l'ombilic. Sa consistance est molle, souple. Les tissus mous du bassin sont infiltrés et animés d'un battement vasculaire général. Les seins augmentent de volume. L'aréole est colorée des tubercules de montgomery saillants.

"Etat général bon. Les sécrétions utérines et vaginales ont disparu, de même que les douleurs avec irridiations que la malade éprouvait avant son opération. La marche et la station debout sont très aisés. Aucun trouble gastrique. La malade doit quitter la clinique demain.

"Le 5 Août.—La malade revient à la clinique. L'abdomen est volumineux. Les mouvements fœtaux ont été perçus. Le ballottement est évident, la grossesse est confirmée. On constate toutefois l'exès de volume de l'utérus proportionnellement à l'âge de la gestation. La malade ne ressent plus les douleurs d'autrefois mais, elle éprouve de temps à autre une sensation poignante dans le flanc droit. Je ne puis attribuer cette

souffrance qu'à l'inclinaison de l'utérus dont l'accroissement se fait avec une grande rapidité.

"L'hypogastre est d'ailleurs saillant et révèle une antéversion assez marquée de la matrice.

"Quant aux sécrétions anormales du début il n'en existe plus d'aucune sorte. L'examen direct du col permet de constater sa forme irréprochable et le maintien intégral des cicatrices."

De ce qui précède quelles conclusions tirer? Je n'en émettrai que deux quant au fait général.

La première c'est qu'on a trop exagéré l'importance des traumatismes du col de l'utérus gravide, la preuve en est dans les quelques observations que j'ai fait connaître au cours de ce travail.

La seconde est que : à titre exceptionnel, et lorsque l'état du col exige une réparation chirurgicale la menace de l'avortement loin d'être une contre-indication justifie l'opération. La réparation du col par le procédé d'Emmet pratiquée sous le chloroforme dans le cas que je viens de citer tout au long et dans le cas publié par M. Juillard n'a réveillé aucune façon la susceptibilité réflexe de l'utérus.

Je pense toutefois qu'il ne faut se résoudre à intervenir que lorsque l'on juge le danger menaçant et j'estime qu'après l'opération les précautions les plus minutieuses doivent être prises pour prévenir et juguler au besoin la contraction de l'utérus. Le repos absolu l'usage des opiacés, la médication anti-abortive en un mot doit-être instituée.

*La réflexion particulière que peut* susciter l'opération d'Emmet pratiquée chez une femme enceinte c'est surtout et pour des raisons inutiles à rappeler *la crainte de l'hémorrhagie.* Or cette crainte n'a pas été justifiée le moins du monde dans mon cas. Malgré mon attente je n'ai pas vu les plaies d'avivement saigner plus que dans la moyenne des opérations de ce genre que j'ai pratiquées en assez grand nombre aujourd'hui. Il ne paraît donc pas nécessaire de tirer argument de la crainte d'une hémorrhagie anormalement abondante contre les opérations pratiquées pendant la grossesse.

## DISCUSSION.

Professor LEISHMAN, while admitting that preconceived opinion was a serious barrier to the general admission of new truth, desired to express a hope that the Section would receive with great caution any such statement as seemed to be involved in the conclusions arrived at by Dr. Doléris in his paper. He did not venture to deny that there might be exceptional instances in which such an operation was warranted, but what he wished to express emphatically was that operations on the cervix during pregnancy were (as in the case just quoted by Dr. Doléris) very liable to lead to abortion, and that if such an operation is to be admitted at all, it should only be in very exceptional instances and after careful consideration of the special circumstances of a given case. He trusted the Section would not express any opinion in favor of the operation without making this perfectly clear. Otherwise there would be a great danger of too frequent operations, with possibly disastrous results.

Prof. THOMAS OPIE, Baltimore.—The suggestion of trachelorrhaphy during pregnancy in certain cases, by Professor Doléris, is a novelty to me, though I have had a single unfortunate case lately, which I will ask permission to relate in this connection.

A lady was sent to me by her physician in January last for treatment for lacerated cervix. I trusted fully her statement and verified the diagnosis of her

ant. I operated on the bilateral laceration, with the result of an abortion at the sixth week.

he delicate relationship between the embryo and uterus, the fact of many nancies going to full term despite lacerations and my warning, would make me d about all surgical operations on the gravid uterus.

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# N THE RELATION OF THE ATMOSPHERE TO PUERPERAL FEVER.

## SUR LE RAPPORT DE L'ATMOSPHÈRE A LA SEPTICÉMIE PUERPÉRALE.

## ÜBER DIE BEZIEHUNG DER ATMOSPHÄRE ZUM PUERPERALFIEBER.

BY JOSEPH KUCHER, M. D.,

Of New York.

The importance of pure air for all, for healthy as well as for sick, is so well recognized that no obstetrician would deny its desirability in the lying-in room. Unfortunately a perfectly pure atmosphere is unattainable. Very often we can do little or nothing to improve the surrounding air, which is always more or less contaminated. Prof. Miguel in his investigations at the observatoir de Montsouris, near Paris, reached air free from germs only at the height of 6–12,000′. While descending to lower levels he found a gradually increasing proportion, until in Paris he estimates them as present to the number of about 2000 to the cubic foot of air. Other observations have shown that the atmosphere of populous districts is thoroughly permeated with these organisms. It having been conclusively demonstrated that we are unable to render a locality absolutely free from germs, the very important question arises, what influence has air impregnated with germs upon the parturient female; particularly can such air cause puerperal fever? The answer to this question is of great practical importance, as the efficacy of measures to prevent puerperal fever depends largely upon an exact knowledge of its etiology. Much as this vexed subject has been written upon, much still remains doubtful as to the exact causative influence of atmospheric air. The older physicians, though not ascribing the origin of every case of puerperal fever to the surrounding air, were thoroughly convinced that at certain times epidemics of puerperal fever had been started by atmospheric influence alone. So-called nosocomial malaria was frequently supposed to be the cause of puerperal fever, until Semmelweiss pointed out that this disease always originates from the absorption of septic matter through lesions in the genital tract, and that the instruments and fingers of the physician and nurse are the chief means of introducing the septic matter to the numerous foci of absorption. Coincidently with the general acceptance of this view fear of the deleterious influence of the atmosphere abated. The same change of views has taken place in surgery. Dr. Kümmel (*Bedeutung der Luft und Contact-Infection für die pract. Chirurgie. Arch. f. Klin. Chirurg. 33 B. 3 H.*) asserts that the scrupulous attention paid to the disinfection of the surrounding air in the early years of antiseptic surgery has now been relaxed. The great majority of surgeons no longer use the spray to destroy noxious germs suspended in the air, brilliant results being obtained without its use in crowded institutions, under unfavorable atmospheric environment, with the single enforcement of most rigid cleanliness of everything coming in direct contact with the wounds. This

would sufficiently indicate the unimportance of air presumably impure as a causal factor of septic disease, compared with the danger from direct contact with unclean hands or instruments.

Though obstetricians have had the same experience, we still find contaminated air quite often cited by them as a cause of puerperal fever, some obstetricians even going so far as to ascribe the good results now obtained in lying-in hospitals more to improved ventilation than to improved local disinfection. C. Braun claims (*Lehrb. der ges. Gynæk. 1881*) that the introduction by him, in the summer of 1863, of Boehm's system of heating and ventilating was followed by a remarkably great fall in the death rate of the hospital. He says, l. c. p. 884, "I am now, from practical experience, convinced that the rapid and thorough prevention of putridity by adequate ventilation is an excellent prophylactic of puerperal fever. After I had procured good air for my clinic by the construction of an excellent system of heating and ventilating, and upon the introduction of this same system in the other Vienna, the Prague lying-in and several foreign hospitals, a new era for these institutions was inaugurated." True it is, a new era for lying-in hospitals has been inaugurated! The mortality and morbidity in the hospitals, formerly in bad repute on account of their high death rate, is now not greater, and sometimes is even less, than in the best private practice. But no mere change in the ventilating apparatus has been sufficient to effect this gratifying result, as C. Braun would ask us to believe. His statements in this regard are disproven by statistics given by himself. For the four years, 1872–'75 inclusive, the average number of confinements being 3302 yearly, Braun's mortality was 2.5 per cent., and this while his ventilating system was in perfect order, and in the very same clinic in which, under Semmelweiss in 1848, with no ventilation system at all, 3556 women were confined, with a mortality of only 1.2 per cent. C. Braun has again and lately reduced his mortality, not by any improvement in his ventilating system, but by a more rigid carrying out of Semmelweiss' directions. This has been the universal experience. For instance, at the large and well equipped Hospitals, Cochin and Lariboisière, in Paris, abundantly supplied with fresh, pure air, the mortality, which reached and even exceeded ten per cent., was reduced, upon the adoption of Semmelweiss' suggestions, to less than one per cent... By the same measures Stadtfeldt lowered the death rate at the Maternity of Copenhagen, from puerperal fever, from 1 in 37 (1865-'69) to 1 in 87 (1870-'74.) Equally striking results have attended the introduction of local disinfection and cleanliness in maternity hospitals in New York. No longer do we hear outspoken condemnation of lying-in hospitals as places of slaughter. The outcry has been turned to just praise by results as gratifying as those just cited wherever Semmelweiss' views have found faithful adoption. Statistics such as these have wrought a complete revolution in the views of obstetricians as regards atmospheric influence. Formerly it has been considered unjustifiable to confine women in an institution unprovided with all hygienic requirements as to the atmospheric and telluric influences. Now these have become a minor concern, and the one important question we now ask in reference to lying-in hospitals is as to the antiseptic precautions adopted, and the strictness of their performance. This is all the information we need to correctly judge as to their salubrity.

The unhealthy appearance of physicians working in dissecting rooms, is often adduced as proof that septic matter may enter the system through the lungs. Charpentier, translated by Grandin, 1886, has the following passage: "We would, however, go still further than Schroeder, and maintain that even the wounds and abrasions are not indispensable for infection. Do we not, indeed, often see true phenomena of poisoning appear in physicians who are frequently brought in contact with cadavers, or are busied with the preparation of anatomical specimens? Here the infection unquestionably occurs through the respiratory and digestive tracts. There is true

septicæmia; and the same holds true, we believe, during the puerperium. The wound is not necessary, but only the presence of the infecting agent." It is true, physicians working in dissecting rooms often look pale, suffer from lassitude, loss of appetite, respiratory oppression, and disposition to profuse perspiration and irregular chills, but they never suffer from distinct symptoms of septic poisoning unless they have cut or scratched themselves with some contaminated instrument, or otherwise brought infectious matter in direct contact with a fresh wound. That the general disturbances mentioned are due to the privation of pure air and not to the absorption of septic matter through the lungs, is shown by the experience of the men working in the great establishments near Paris where animals are flayed. An abominable stench, with more septic matter than is present in any dissecting room, is developed there, and the laborers never suffer from any of the above-mentioned complaints. They look hale and hearty, much better than many mountaineers, because they work in the open air, and not in close, ill-ventilated rooms. The same is true of the men working on Barren Island, in New York Bay. These men suffer from septicæmia when they bring infectious matter in contact with lesions of the skin. These lesions may be so small as to be overlooked even on careful examination. I have seen a number of cases in which physicians or helps working in dissecting rooms had infected themselves, but in every case the infection had taken place through a lesion of the skin. In most of the cases the lesion of the skin had not been noticed before the symptoms of the inflammation appeared. Small lesions, being usually neglected, are more dangerous than large ones. If we bear in mind that the poison may find entrance through microscopical lesions we will not so readily agree with Charpentier when he says, loc. cit.: "Besides these facts of contagion by the vaginal or uterine wounds, it seems to us impossible not to admit contagion by other routes: How otherwise to explain those cases noted by Depaul, Tarnier, Hervieux, where women were infected before labor, and, therefore, the existence of any wound. And how explain those instances where young women have been poisoned by the simple fact of sojourn among puerperæ during an epidemic. Tarnier says: "It is probable that by the lungs, offering as they do conditions favorable for absorption, infection often, if not always, occurs. Others grant absorption by the intestines wherever some cause or other destroys the integrity of the mucous membranes or augments the proportion of the germs, whether absolutely by the direct introduction of septic substances by the digestive tract, or relatively by the arrest of the fecal current; then the fight becomes unequal and septicæmia results."

Cases in which, by painstaking inquiry, the infection has been accurately traced to the transfer of septic matter through the medium of physician or nurse have recently become so numerous, and the results from rigid enforcement of antiseptic measures so marked, that even those obstetricians who still retain their belief in the noxious influence of hospital air, are not now as ready to accept this belief as a satisfactory explanation of its origin when puerperal fever develops in their hospital practice, and do not rest content until they have found a more demonstrable cause. In private practice, for many and apparent reasons, the case is different. Here the physician, particularly if some antiseptic lotion has been used, is apt to fall back upon the vague and comforting assumption of infection from sewer gas or other contamination of the air, and should the possibility of direct transfer of septic matter by the attendant be suggested to him, would, no doubt, vigorously deny such a conclusion, on the ground of employment of antiseptic precautions. In this connection the following experiments are instructive as demonstrating the worse than uselessness of a mere perfunctory use of any antiseptic lotion—worse than useless, because of the false sense of security such a use engenders. They were undertaken to determine the degree of effort, length of time and strength of solution requisite to render the hands aseptic. First, hands which might be regarded as in a normal condition were used, and then hands which had been

brought into contact with known septic matter. The test as to when the hands were completely sterilized, was to dip them into gelatine while still wet with the antiseptic washes. The gelatine was afterward examined for the presence of germs. The first series of hands was found to be aseptic when washed for three minutes with nail brush, hot water and soap, and then for one minute with thymol solution 0.6 per cent., sublimate solution 0.1 per cent., or carbolic acid 3 per cent. ; but to thoroughly cleanse hands which had been contaminated by contact with infectious matter required vigorous scrubbing for five minutes with brush, hot water and soap, followed by a two-minute brushing with 5 per cent. carbolic acid solution or chlorine water. We will not wonder at this when we bear in mind that infectious matter may lurk in the innumerable creases and fissures in the hands, in the ungual folds or under the finger nails. Only when everything destined to come in contact with the genital organs of the patient during the puerperium is as vigorously aseptized as were the hands, the subjects of the experiments, can we conscientiously say that antiseptic measures have been employed. It is no argument for the abandonment of these measures that so many women go through childbed without their use, and do not have septic poisoning. This proves only that the attendants have not been exposed to septic contamination or that the patient is not susceptible to its influence. As with other poisons so with the septic poison ; we have abundant opportunity to observe the different sensitiveness of different individuals to its influence ; and not only do these differences exist between different individuals, but the same person will be found to be differently susceptible at different times. Of ten cases of puerperal fever, in nine the origin can be distinctly traced to the contact of septic matter with a wound, and it is only logical to refer the tenth case to the same cause.

Overcrowding in lying-in hospitals is often considered a cause of epidemics of puerperal fever, it being supposed that by overcrowding the air becomes so contaminated as to give rise to septic poisoning. The good results obtained by Tarnier, in his pavilion, where not alone was the building isolated, but the patients were confined in separate rooms, would seem to confirm this supposition. But, as equally good results have been obtained in overcrowded and ill-ventilated institutions, the argument loses all its force. Another argument for the possibility of infection through the air is the well-known fact that puerperal women suffering from septic infection often rapidly improve when transported from an illy situated, illy ventilated room to a better situated and better ventilated apartment. The same beneficial effect follows the same change in other diseases, and proves only that good air is conducive to more rapid recovery.

When we have once come to the conclusion that the danger from atmospheric influence is insignificant as compared with the dangers of infection from contact, we will not commit such mistakes as the following, narrated by Lefort (*Gazette des Hôpitaux*, 1886, No. 1). As long ago as 1865 Lefort emphasized the greater danger from infectious contact as compared with atmospheric infection in diseased conditions of wounds and puerperal fever. In this paper he cites, as additional evidence on the subject, an account of an epidemic which numbered among its victims the daughter of a colleague. To secure the greatest possible safety from epidemic influences, the patient was delivered at her country seat, and died there, of puerperal fever. Careful examination disclosed the fact that the nurse had recently been in attendance upon four women who had died with similar symptoms, though no case of puerperal fever had occurred in the practice of other midwives or of the two physicians living in the vicinity. The original infection of the nurse had been through a case of fistulous abscess of the thigh. A little study of this case will save us the mistake of being over careful as to the place of confinement, and neglectful as to the choice of nurse, and will simply emphasize the conclusion which so much other irrefutable evidence supports, that immunity from puerperal fever does not depend upon location, but upon the care taken to prevent

septic contact. In the worst types of overcrowded tenements, without sewerage or with leaky pipes and, consequently with foul air, puerperal septic affections can usually be traced to the carelessness of the attendants. In no wise do I wish to be understood as decrying the importance of pure air, as some reviewers of my book on "Puerperal Convalescence," etc., have imputed to me. I consider pure air as the best tonic we have. I grant that bad air exercises a debilitating influence upon the patient, and so may render her more susceptible to septic infection, but an overwhelming mass of evidence is at our hand to prove that were septic matter never brought in direct contact with a denuded absorbing surface, puerperal fever would be almost unknown. Were this the universally accepted view, measures to prevent puerperal fever would be more faithfully and intelligently pursued, and the inaction resulting from a belief in atmospheric infection would disappear. For the tenacity with which this belief is adhered to, despite the lack of any connected facts to substantiate it, I can only quote, as explanation, from John Stuart Mill, on the fallacies of observation: "But the greatest of all causes of non-observation is a preconceived opinion. That it is which, in all ages, has made the whole race of mankind, and every separate section of it, for the most part, unobservant of all facts, however abundant, even when passing under their own eyes, which are contradictory to any first appearance, or any received tenet."

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Dr. W. W. JAGGARD, in the absence of the author, read the following paper:—

## ON THE PREVENTION AND TREATMENT OF PUERPERAL FEVER.

### DE LA PRÉVENTION ET DU TRAITEMENT DE LA SEPTICÉMIE PUERPÉRALE.

### ÜBER DIE PROPHYLAXIS UND BEHANDLUNG DES PUERPERALFIEBERS.

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As long as puerperal septicæmia remains the most deadly of perils of childbirth, its prevention and treatment must be a subject of abiding obstetric interest, and one well worthy of re-discussion by the International Medical Congress. The very existence, however, of any such specific disease as puerperal fever has been questioned by some recent theorists, whose views, even if they were scientifically accurate, which they are not, must nevertheless be completely disregarded by those who in obstetric practice have to deal with septicæmic disease consequent on parturition and apparently *sui generis*.

The potentiality of this constant factor in the causation of puerperal mortality is clearly shown by the latest report of the Dublin Lying-in Hospital, wherein during the triennial period ending Nov. 6th, 1886, out of forty-three deaths connected with delivery, eighteen were occasioned by puerperal septicæmia, being a mortality from this cause of 1 in 189 deliveries. The present puerperal death rate in the Rotunda Hospital, although higher than some of those former epochs, when, according to my friend, Dr. Johnson, it was as low as 1 in 309, or again, 1 in 220, certainly shows a great improvement on the quinquennial period, when, according to the same authority, it was as high as 1 in 31; or even to that noted during one year of my own connection with the hospital when, puerperal fever being epidemic, in a total of 1132 deliveries there were twenty-eight deaths, of which sixteen, or 1 in 150 deliveries were caused by puerperal septicæmia.

That the prevention and treatment of puerperal fever still demands consideration is further proved by the statistical reports of our official registration department, from which I may here briefly cite a few facts more fully detailed in a former communication of mine on this subject, in which I showed that within the preceding thirty-four years no less than 164,446 deaths had occurred in England from that specific puerperal septic disease, the very existence of which some writers have, nevertheless, controverted. The statistics referred to, which do not include Ireland or Scotland, where puerperal disease is no less prevalent than in England, by no means fully represent the mortality thus occasioned in these countries. The majority of the poorer classes of lying-in patients have practically no medical assistance whatever during labor, being then generally dependent on the good offices of some friendly neighbor, or the assistance of some, perhaps hardly less ignorant, midwife. Under such circumstances it would be as reasonable to hope for any effectual treatment in an instance of puerperal septicæmia as to expect an accurate statement of the cause of death in a fatal case of this kind.

From these facts it would appear that we must probably be content to relegate to what Mr. Gladstone designates "a dim and distant future," that promised stamping out of puerperal septicæmia which some have anticipated from the progress of obstetric science, and more especially from more rapid methods of delivery and the antiseptic treatment of puerperal patients now generally employed.

Turning now to the etiology of puerperal septicæmia, it may be premised that under this heading are includable all forms of septicæmic fever consequent on parturition and occurring within the puerperal period. These, whatever phases they assume at different times, or by whatever names they may be described, are the manifestations of a specific infectious puerperal disease, the character of which is variously modified by the general condition of the patient, the intensity of the septic intoxication and the prevailing epidemic constitution of the atmosphere in each instance.

Moreover, this puerperal sepsis may be introduced in various ways, viz.: firstly, by the micrococci of other clinically allied epidemic disorders; secondly, by infection with septic matter or by microörganisms emanating from other puerperal patients; and thirdly, the disease may result from auto-infection with self-generated septic matter. That a disease thus many sided in its genesis and propagation can ever be completely eradicated by any hygienic or antiseptic measures, therefore, appears to me as one of the most utopian of the many fond day dreams of modern sanitarians; especially impossible would it seem to be, to thus permanently stamp out puerperal fever from the crowded maternity wards of great hospitals, general or special, when constantly occupied by lying-in patients, in the atmosphere of which septicæmia seems liable at times to develop with a rapidity and special virulence that apparently defies either prevention or treatment. Nevertheless, the essential importance of the most scrupulous attention to the puerperal hygiene as an obvious method of at least diminishing the prevalence of puerperal septicæmia, needs no enforcement, nor have I any doubt of the practical utility of some of those rules and precautionary measures which have been formulated by Dr. Fordyce Barker, for this purpose. The value of such measures has been recently illustrated in the practice of the Dublin Lying-in Hospital, where, as I said before, a great improvement is observable in this respect since the time when its wards, as stated fifteen years ago by a former Master, the late Dr. Evary Kennedy, had been haunted by puerperal fever for 97 out of the 111 years that had elapsed since its foundation.

For the prevention of puerperal fever the preparatory treatment of the patient before delivery, by suitable nourishment, fresh air and appropriate tonics, is of primary importance. With this latter in view I generally direct a mixture containing the chlorate of potash, iron and quinine to be taken during the last couple of months of gestation, and I have never seen puerperal septicæmia in a patient who had been thus treated before her confinement.

During the puerperal period the functions of the nurse are all important, and it is never beneath the dignity of any obstetric practitioner to supervise with the utmost vigilance her care of the sanitary surroundings and personal cleanliness of the patient. From the first day after delivery until convalescence has taken place the uterine cavity, as well as the vagina, should be daily thoroughly washed out with water as hot as can well be tolerated, to each pint of which may be added an equal quantity of sanital, which, from its absence of color as well as its aseptic properties and agreeable odor, seems specially suitable for this purpose. Or, should the practitioner prefer, this may be replaced by a little carbolic acid, or even by a small quantity of rectified spirits of turpentine in the water. I may observe that I now never employ in this way the corrosive sublimate solution recommended by others for this purpose, as I regard its use as extremely unreliable and unsafe in such cases. Nor for this purpose do I employ the ordinary syphon syringe, which I think is not adapted for washing out the uterine cavity during the puerperal period, as there is then manifest danger of the injected fluid being either forced through the patulous Fallopian tubes, or else into the still open and dilated uterine sinuses. I have myself elsewhere reported cases in which these ill effects have thus attended the use of the ordinary syphon syringe, and hence have abandoned its use in puerperal cases, and advise the employment in its stead of an instrument such as my irrigator, by which the necessary washing out of the uterine cavity after parturition can be as effectually and more safely carried out.

As a general rule liquor ergotæ (B. P.) should be administered two or three times a day, in full doses, throughout the puerperal period, or until the uterus has sufficiently regained its normal condition, and in the majority of cases this may be advantageously given in combination with the tincture of the perchloride of iron.

With regard to the treatment of puerperal fever we have unquestionably either advanced materially, or else the present type of the disease has become much more amenable to our remedial measures than was the case at the time when one of the most experienced of our obstetric teachers asserted that he would as willingly be called in to treat a case of hydrophobia as to one of puerperal fever. And even within my own recollection it was stated by the late Dr. Stokes that in his extensive experience with this disease, in over forty years' practice, he had never seen a single case of metria in which the patient recovered. Fortunately this can no longer be said, and I shall now very briefly refer to those measures which, in my own experience in hospital and consultation practice, I have recently found most serviceable in the treatment of puerperal septicæmia.

Our treatment of such cases must obviously be governed by the type of septicæmia as well as by the special circumstances of each case. At the present time the prevailing type of puerperal fever is of a distinctly remittent, typhoidal character, and should be primarily treated by appropriate general stimulants and nutriment, as well as by local attention to the removal of all septic matter from the uterus in the way already pointed out. With regard to medicines, very few drugs appear to deserve any consideration in this connection, viz.: turpentine, iron, quinine and ergot, to which short list opium may in some instances be added. Of these remedies the one to which I attach most importance is turpentine, which may in the majority of cases be administered by the mouth or by the rectum as long as its use is tolerated by either, and which may, moreover, be introduced through the skin, acting as the best of external stimulants and counter-irritants in such cases. Under this treatment I have frequently seen recovery occur in very unfavorable cases of puerperal fever. Hence I would be disposed, in some measure at least, to endorse the panegyric on this drug which I discovered in the pages of an old periodical, *The Milesian Magazine*, the editor of which, Dr. Brennan, was eighty years ago ignominiously driven out of the Dublin Lying-in Hospital for daring to administer turpentine in a case of puerperal fever. The value of

this remedy, however, and the sagacity of its long forgotten discoverer is, I think, amply vindicated by the experience of those who now have adopted his practice in this respect; turpentine being, as I have found, not only a most potent stimulant, but also an active depurating agent and increasing elimination from the skin and kidneys in such cases. Moreover, turpentine also appears, and that too probably in a more marked degree than any other medicine, to have some influence as a germicide in arresting the development of those microörganisms which are so intimately connected with the development of puerperal septicæmia.

## DISCUSSION.

Dr. DANIEL F. NELSON:—I have two thoughts to express: The value of the sulpho-carbonic acid treatment of puerperal fever, as illustrated by two cases, and the importance of the mental and nervous condition of the patient, as favoring, or otherwise, the advent of puerperal fever.

Mrs. B. was delivered by instruments, with great difficulty, April 16th, 1887, of her third child. Antiseptic precautions were used. On the evening of the third day the temperature rose to 102°, and the next morning (fourth) was 103°, and in the afternoon 104°, and the next day (fifth) it reached 105⅘°.

As soon as the temperature began to rise, quinine in five- and ten-grain doses, with brandy, were freely used, and on the fifth day pilocarpine, in one-quarter grain doses, with saline laxative, was given every three hours, till the bowels were loosened; also digitalis and the brandy continued.

In the evening of the fifth day, at the suggestion of Dr. C. M. Fidet, of Chicago, three quarts of carbonic acid gas, impregnated with the vapor of the bisulphide of carbon, were slowly injected into the rectum. The carbonic acid was passed through a tube filled with cotton and saturated with a teaspoonful of the bisulphide of carbon. The patient did not rest well during the night, but in the morning the temperature had fallen to 101½°, with a corresponding improvement in the pulse and respiration.

The morning of the sixth day three quarts of the gas were again injected, and in the afternoon the temperature reached 105°.

The morning of the seventh day the temperature was again 101⅛°. The patient rested better than during the previous night. Gas repeated, the same quantity as before, though patient complained of its producing pain in the rectum. Highest temperature on the seventh day, 103⅘°, and on none of the days when the gas was given did the highest temperature continue as long as before its exhibition.

Gas repeated in the evening of the seventh day, but only two and one-half quarts given, as it caused great distress in the rectum and abdomen. Highest temperature on eighth day, 104°, but of short duration. In the morning two quarts of gas given, producing great distress and but imperfectly retained, and in the evening three quarts with a like result, and this was the last time it was given.

The bowels became loose on the sixth day, and continued so, but not till the seventh day did the stools become bloody and slimy, and the suspicion was aroused that the gas was irritating the rectum, and it was discontinued on the evening of the eighth day. The improved temperature and other symptoms on the sixth and seventh days gave promise of recovery, till the frequent bloody stools of the seventh and eighth days changed the prognosis. Some of the stools were nearly pure blood.

Death occurred on the morning of the tenth day after delivery.

The second case I saw in consultation with Dr. A. Dahlberg, of Chicago, who has kindly furnished me with notes of the case and carried out carefully the plan of treatment suggested.

Mrs. A., the wife of a clergyman, age 27, two children, pregnant in the fourth

month. Had a mild form of typhoid fever some two weeks; miscarried the beginning of her third week in bed. The fœtus came away in the membranes without rupture, and the whole of the placenta seemed to have been expelled. Hot vaginal injections, carbolized, were used morning and evening for several days.

Before the miscarriage for some days the temperature had ranged in the morning 101° to 102°, and in the afternoon 103° to 104°, and after the miscarriage there was no change in the temperature until the third day, when the afternoon temperature reached 105°, preceded by a chill. At this time a slight rash appeared in spots over the body, and soon nearly covered the skin, especially on the chest, abdomen, hands and arms. It was of a deep-red color, and consisted of fine raised papules, very closely resembling the rash of scarlet fever.

The next day the eruption had covered nearly the entire body and the patient presented very closely the appearance of a patient with scarlet fever in the midst of the eruptive stage. The slight cough which had existed during the whole of her sickness was more severe, dry and harsh.

It was at this time that I was called to see her. The morning temperature was 103° and the afternoon 104° to 105°.

I suggested the use of pilocarpine till the skin should become decidedly moist, and advised the use of the sulpho-carbonic acid by the rectum two or three times a day, as described in the former case. After using the gas three times, the temperature did not reach 103° again, and usually did not rise higher than 102°, falling below 101° in the morning. The gas was used on nine consecutive days—once the first day, twice the second day, three times the third, then twice a day for three days, and finally once a day for three days, when it was omitted, as it was beginning to irritate the rectum, and the cough was becoming more troublesome, as if the gas was irritating the lungs. The gas was used fifteen times, three quarts at each time.

The second day after using the gas, the rash began to disappear, and in a day or two was all gone. There was no desquamation of the skin. After omitting the gas the patient convalesced rapidly, soon losing her cough, but regaining her strength rather slowly.

Of three cases of well-marked septic or puerperal fever, in patients whom I have delivered myself, one was a case of contagion or transfer.

In the other two, no outside source of contagion could be traced, but both had this common element, both fully expected not to live through the confinement, and, I might almost say, did not wish to live. I need not try to explain the reasons for these thoughts; suffice it to say they made, in both cases, a profound impression upon each patient. In Mrs. B.'s case, briefly narrated above, during the first three days, when all the symptoms were the most hopeful, and on the sixth and seventh days, when the promise of recovery was good, there was almost a feeling of disappointment, and her oft-repeated statement was, that "medicines would do no good;" "she would not recover."

In the other case a great difference in religious belief of the husband and wife was making a promise of so much unhappiness in the future, that the wife hoped she would not recover.

The germ theory of puerperal fever I do not propose to discuss. Suffice it to say that it the best explains the history and progress of the disease of any yet proposed. But the point I wish to make plain is, that profound mental and other impressions upon the nervous system which produce a prostrating or debilitating effect—as for example, fear and shock—are like the poisons of typhoid fever, diphtheria and the like: they tend to paralyze the nerves which control the muscular fibres in the vessels and in the walls of the uterus, as would sections of these nerves.

In this way they aid in the absorption of the poisonous materials which may be in

the uterus or genital canal, and serious or fatal results follow which would not have occurred had not these impressions been made upon the nervous system.

The importance of the nervous system as a factor in the development of puerperal fever is illustrated in another way at times. A saline cathartic is given three or four days after delivery, when there are putrid materials in the uterus, or along the genital canal. Copious watery discharges from the intestines are the result, and to produce these there has been a rapid absorption of fluids by all the vessels, including those in the uterus and vicinity, which will convey poisonous materials into the blood.

In this way, while free purgation eliminates poisonous materials from the blood by exosmosis, it aids endosmosis of a further supply of septic materials, provided such materials are in a position to be absorbed.

Before giving cathartics, then, all septic substances should be removed from the uterus and genital canal, as they favor absorption from the tissues, as well as eliminate from the blood.

If the source of supply of the septic poison is exhausted, then the cathartics will undoubtedly aid in excreting from the blood, and so conduce to a favorable result; but if there are septic materials in position to be absorbed by the vessels (veins and lymphatics) free purgation will aid further absorption, as well as the elimination of what is already in the blood.

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## THE CONSIDERATION OF CERTAIN QUESTIONS REGARDING PUERPERAL FEVER—RETAINED DÉBRIS ONE OF THE CAUSES; THE INTRA-UTERINE DOUCHE AND CURETTE ONE MEANS OF CURE.

### CONSIDÉRATION DE CERTAINES QUESTIONS CONCERNANT LA SEPTICÉMIE PUERPÉRALE, DÉBRIS RETENUS L'UNE DES CAUSES; LA DOUCHE INTRA-UTÉRINE ET LA CURETTE L'UN DES MOYENS CURATIFS.

### BETRACHTUNG GEWISSER, DAS PUERPERALFIEBER BETREFFENDER FRAGEN—ZURÜCKGEBLIEBENER DETRITUS EINE SEINER URSACHEN; DIE INTRA-UTERINE DOUCHE UND CURETTE EINES DER HEILMITTEL.

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One of the most vital and important questions of the day is, How shall we establish a safe puerperal convalescence?

A former student of mine, now practicing in Michigan, reports that a neighboring practitioner has lost twelve parturient women during the last six months, and an examination of our mortality reports always shows deaths from puerperal causes. If one makes inquiry among the obstetricians and midwives, the fact will be developed that quite a number of their patients succumb to disease shortly after confinement, but according to their ideas of pathology, the cause is malaria. And those of us engaged in life insurance examinations are frequently astonished at the reply to the question: "If applicant's mother is not living, of what did she die?" How many times comes the

answer: "A few days after confinement," or "From some disease that had its origin in childbirth."

I need not speak of the terrible mortality which has been present in times past in the large hospitals of the old world, such as in the Hospital Lariboisière, where it has been 8 per cent., or in the Maternity in Paris, where it was formerly 10 per cent. or in Berlin, where, at one time, there was one death from childbirth in every 152 confinements, and in Vienna, where 10 per cent. were lost. In all probability it has arisen to 15 and even 25 per cent. during some epidemics. Notwithstanding these figures we have men in our profession who say that parturition is physiological—a process as natural as the digesting of food—and that they never have puerperal fever. If it is a physiological process, surely something is wrong, and we need to study it; and if it is pathological, with such a mortality, it is certainly our duty to investigate the causes that bring about such terrible results.

It seems that it should be enough that a woman pass through all the discomforts and inconveniences and solicitudes of pregnancy, and the pains and anxiety of parturition, without being subjected to additional dangers at the close of these processes. But it is not so. During the few days following there comes about, in almost a multitude of cases, such a series of unfortunate results, that many of the most valuable members of the community, and among them those who are surrounded with the most beautiful prospects for the future, are consigned to early and untimely graves.

Where does this disease come from? Are we always certain that all of the membranes and all the placenta come away? Can any one always tell, by an examination, that there is not a small amount of débris still remaining in the uterus? Do all practitioners examine the placenta carefully? Are these women poisoned by themselves, or must the doctor or nurse bear the responsibility?

These are some of the questions which come to me as I write. Of course I cannot consider them all in this paper.

I desire more particularly at this time to speak of the retention of membranes and small pieces of placenta as a cause of puerperal fever, but in order to understand the relation between these substances as the cause of this terrible disease, and other factors which enter into the etiology of puerperal fever, it will be profitable to discuss very briefly a few of the different theories respecting this disease.

The great fight carried on during the past forty years has been to decide whether puerperal fever is produced by causes from within or from without; in other words, is puerperal fever autogenetic or heterogenetic. It is entirely useless to discuss old theories, which long since have been, or should have been, consigned to the museum of antiquities, and so it will not be profitable for us to speak of any theory previous to the time when Semmelweiss, in 1847, advanced his theory. In the main, this was, that puerperal fever was due to absorption of decomposing matter, and that it may come from either auto- or hetero-infection.

Among our own countrymen, the ideas advanced by Fordyce Barker have held firm sway. I will not give his entire confession of faith, as he terms it, but will quote briefly from it.

He believes that the disease comes from some unknown blood change, and that we are as ignorant of it as we are of the blood changes in scarlet fever, or in any of the other essential fevers. He believes that it may be epidemic, infectious and contagious. He says, in conclusion, that septicæmia may be developed in a puerperal woman either from autogenetic or heterogenetic infection, without puerperal fever, but that this infection may also complicate puerperal fever. In the celebrated discussion on puerperal fever in New York, in 1884, he held, substantially, the theories advanced above, although his ideas were promulgated in 1874.

One other authority in this country has studied, with very great earnestness, the germ

theory of puerperal diseases, and his opinions are held in very high regard, not only by us, but by foreign authorities. I refer to Professor Lusk, who, with some restrictions, evidently believes in the germ theory, but says the difficulty is best solved by assuming, with Genzmer and Volkmann, that there is such a thing as an aseptic surgical fever, due to the absorption of the products of physiological tissue changes at the seat of injury. He also says that we never can exclude the possibility of infection in puerperal wounds, and in the sixth proposition, in which he discusses the subject, he uses the following language: "In the present state of our systematic knowledge, it is necessary to admit that there is a limited number of febrile and inflammatory disturbances occurring in puerperal women, the bacterial origin of which may be fairly questioned." Professor King, in his eminently practical book, believes in both the auto- and heterogenetic origin of puerperal fever.

Parvin, in his late work, is probably more in sympathy with advanced German ideas on this subject than any other American author. He says the doctrine of autogenesis is a confession of ignorance, the creed of fatalism, the cry of distress. Self-infection means that the house sets itself on fire, and that the powder magazine is exploded without any mischievous spark, and that this doctrine of the autogenetic origin of puerperal septicæmia is, to his mind, the very pessimism of obstetric medicine. He concludes by exclaiming, "Why should the city guard its gates when the enemy can already be in the citadel and begin the battle there?"

We now turn to the English authorities. Galabin says that the first possible internal source of poison is the blood itself. Owing to the rapid absorption accompanying the involution of the uterus, a large quantity of effete material is poured into the blood, to be disposed of by the excretory organs. He discusses both autogenetic and heterogenetic forms of the disease, and says that even in autogenetic forms the poison is generally produced by germs received from the air, or in some way from the outside, and that the sanitary condition of the house or locality may have a great influence.

Barnes, in his work of 1885, certainly believes in the autogenetic origin of puerperal fever, and describes rather fully what he calls excretory-autogenetic puerperal fever. Speaking somewhat in doubt in regard to the germ theory, Barnes asks how these infective microbes are introduced. He makes the statement that some women are attacked with puerperal fever before labor, and he also asks the question: "How do organisms find entrance into the system in those most terrible cases of all, in which death results in a few hours?"

Let us now examine into the teachings and methods of practice of continental authorities—the German, French and Italian teachers.

In the main, I think they agree as to etiology. If the question is asked in regard to the probability of recovery after a given obstetrical process or operation, the reply has come to us repeatedly: "She will recover, if I have not infected her."

The summary of everything is, that puerperal fever in every instance is produced by some cause from without; that there is no such thing as autogenetic infection. Retained membranes and placenta, according to this theory, are perfectly inert if infection from without does not take place. This makes the responsibility simply terrible. Kucher, speaking on this subject, acknowledges that a physician has a perfect right to his own theories, but says that in a question of great consequence no such liberty can be permitted.

It is a well-known fact that in Carl Braun and Spaeth's wards, in Vienna, the mortality has been reduced to $\frac{55}{100}$ of one per cent., or a little over half of one per cent.

As I walked through their wards during the past summer, and came into rooms where thirty women had been confined during the preceding thirty-six hours, and would find the air in such rooms perfectly pure, absolutely free from odor, and every one with

normal temperature, or so nearly normal that it is not worth mentioning, and then remembered that in private practice, with only a single woman in a house, and sometimes in new residences, where contagious or infectious diseases never existed, most terrible odors and high temperature and continuous fevers were sometimes noticed—indeed, a much worse condition with a single patient in a private house than was noticed in a ward with thirty patients, in a hospital atmosphere, I was convinced that their method of practice was worth imitating.

In these wards, when a woman's temperature rises to 103° F., she is given a uterine douche and the curette is frequently used. I provided myself with the necessary appliances, and determined, should occasion demand, to try their efficacy. I did not wait long. A few days after my return, I was called to see a case in Chicago, with the following history: A young woman from a neighboring State came to the city and had a criminal abortion performed. At the end of the week her symptoms were so alarming that she changed physicians. He found her temperature 103 °F., and called me in consultation. Intra-uterine douche of carbolized water did not bring it down, and she was curetted, and a considerable amount of membranes and débris was brought away. A coil was placed upon her abdomen, and her temperature, which had been 105¼° F., came down to normal in twelve hours, and she made a recovery without a single bad symptom.

CASE 2.—Another lady, the mother of several children, was confined, and did well until the tenth day. I was requested to see the patient, and found her temperature 104° F. Gave intra-uterine douche and curetted. Temperature came down, and she made an excellent recovery.

CASE 3.—A lady at some distance in the south division of our city aborted at the end of four months. It is probable that this loss was from gonorrhœal infection. Temperature the second day, 104⅕° F.; anxious look; bad pulse; more or less distention of the abdomen. Symptoms were all bad. Gave intra-uterine douche and curetted. Temperature came down to normal the following morning, and she made a good recovery.

Other cases have been operated upon, and in every instance where contraindication did not exist, a favorable result has always taken place.

Operations undertaken as the last and only resort have not been uniformly successful, but no bad symptoms have ever been produced.

There is no doubt in my mind but that puerperal diseases are more frequent than many are willing to believe; that they take place frequently in the practice of physicians who say they have no cases of puerperal infection or puerperal fever. It demonstrates that we need to study this matter to a greater extent then ever before.

Of the three cases which I briefly narrate, the temperature coming down at once, and an excellent recovery taking place, it is safe to say that without the operation they would have had a lingering sickness with, all the symptoms of septicæmia. It is possible that one would have died, and entirely probable that those recovering would have had an illness of from three to six weeks.

The cause of puerperal fever is infectious matter, which, undoubtedly, exists in many forms, and gains entrance into the system in many ways. Whatever the supposed cause, as we formerly thought—whether contused tissues, or clots, or pieces of membranes or placenta—it is now believed that the additional element of *infection* must be obtained from some source foreign to the healthy tissue. It is explicity stated by some authorities, that blood coagula and pieces of placenta in a uterus *firmly contracted* are perfectly inert, unless infection takes place.

Every practitioner of experience has seen pieces of placenta and quite large clots of blood come away, and no signs of fever follow. On the other hand, the same practitioner has seen pieces of placenta or small clots expelled by the intra-uterine injections

which had been ordered after a high temperature, with sepsis undoubtedly present. What makes the difference? Simply this: In one case the débris has escaped infection; in the other, from some cause (sometimes absolutely undiscoverable), the débris has become infected.

I do not believe it is possible that we can ever be sure that every particle of placenta or all of the membranes are expelled, no matter how careful we may be in the examination.

Inasmuch as it is impossible, in the present state of our knowledge, to always say that our hands and instruments, and the hands and appliances of the nurse, are perfectly aseptic, it is our duty to take extraordinary precaution in regard to the introduction of septic matter. Not only this, but we should inspect the placenta, wash it out and place it together, to look for small pieces that may be absent. With all these precautions, we cannot be certain that everything has come away. There may be small pieces of placental tissue which have existed on the membranes somewhat remote from the main body of the placenta. These may be entirely detached from the membranes, and no earthly power can detect it. And then there is evidence sometimes that all of the decidua does not come away—that there is something of this left in the uterus. There is no doubt but we have very frequently some débris left in the uterus, which will give rise to septicæmia if only an infectious element comes in contact with it.

It appears to me that, in the present state of knowledge, no one is justified in disbelieving the germ theory, and not taking the precautions which have given such remarkable results in some of the lying-in hospitals. I quite agree with the authority whom I have already quoted, that we have no right to take such a great responsibility as to be disbelievers, even if we cannot accept all the advanced ideas of the German teachers. Their results have been so good that we are not justified in practicing obstetrics in the slipshod way in which a great many of our practitioners have practiced, and, it is to be feared, are practicing to-day.

One of the most valuable contributions to our present state of knowledge in regard to microörganisms and suppuration has recently come to hand in a prize essay furnished by George Klemperer, an undergraduate clinical student in Berlin. It is in regard to the question as to whether the irritants in the tissue will produce suppuration when no bacteria are present. It is regarded by this gentleman that the precautions taken by previous experimenters, who have gone over this subject before, to prevent entrance of germs into the tissue cavities containing these irritants, have been uncertain and inadequate. He has gone over the method formerly adopted by Straus, of Paris, in 1883, and his process is something as follows:—

After producing an eschar on the skin with a Paquelin cautery, he introduces the canula of a sterilized syringe through the eschar beneath the skin. After the puncture is made, he again occludes that opening with cautery. Such irritants as turpentine, croton oil and mercury are used, and with the above precautions, in three cases only has pus containing micrococci been found. A considerable degree of inflammation is produced by this injection, but no pus. Among his conclusions are the following: Injections of alkalies, organic or inorganic acids, never produce suppuration, if microorganisms be excluded. The irritants mentioned above produce violent inflammation, but no suppuration. If the results of these experiments are demonstrated to be true, it will be safe to say that no suppuration occurs unless through the agency of microorganisms, and its bearing on infection of pieces of placenta in a contracted uterus will be important.

Another question in regard to these organisms in healthy tissues has been recently gone over by Hauser, of Erlangen, with the result that microörganisms do not occur in tissues of healthy animals. All of these arguments and investigations go to prove

that autogenetic poison is impossible, and, consequently, if our cases are followed by sepsis, it must be due to an infection which has come from the outside.

Dr. Bayard Holmes, in an unpublished paper read before the Chicago Gynecological Society, on the bacteriological condition and fate of dead retained fœtuses, demonstrates that they are perfectly sterile.

Dr. Galabin, in his Hunterian oration, on the etiology of puerperal fever, delivered recently, used the following language: (It will be remembered that in the early part of this paper I quoted from an obstetrical work of this gentleman, and in that he leaned toward the autogenetic origin of puerperal diseases.) He says, in substance, that the old divisions of puerperal fever into autogenetic and heterogenetic classes, may clearly be regarded as a less radical and scientific division when it is remembered that in every case of true traumatic infective disease, the microbes or their germs must come from without. He makes some statements which modify this to a certain extent, but he is coming to believe, as is evident throughout his entire oration, in the impossibility of autogenetic infection.

If it is true that some débris may remain in the uterus, nothwithstanding the greatest possible care, and also true that the most ardent believer in the germ theory sometimes has infection following his obstetric procedures, it seems to me that the operation of relieving the uterine cavity of this poisonous matter, if it can be done early, is one of the first operations to which we should resort in the cure of this dreadful disease.

In every parturient woman whose temperature goes to 103° something should be feared. It will not do for us to fold our hands and try to convince ourselves that it is a little malaria, or that it is milk fever, or something that may not jeopardize the life of that woman. I am free to admit that we do occasionally have a temperature of 103° or 104°, which is trivial, and disappears in a very short time. On the other hand, I do know that a great number of practitioners, who try to convince themselves that this temperature is not due to septic influences, have these cases, which last, with fever, and sweats, and prostration, for weeks, and sometimes months.

It has appeared to me that in the majority of cases that I have watched carefully, the first explosion, the result of infection, takes place about the third or fourth day, and again about the seventh or eighth day. If the uterus of any woman whose temperature goes to 103° on the fourth day could be thoroughly washed out in a way which I shall describe, it is my belief that a very large number of them would have no more fever—that they would have a safe puerperal convalescence. If they are left until the seventh or eighth day, until the second explosion, in many cases the infectious matter and the prognosis will be more grave. Intra-uterine injections, first of carbolized water, or, if sublimate solution is used, the uterus must be washed out with perfectly pure water. Then, if the temperature does not go down, the following day the curette should be used, with all possible antiseptic precautions. It does not do to use the finger as a curette, nor does it do to use the small, short curettes, as they are entirely inadequate, and do not reach the point of disturbance.

If puerperal fever is due, in a given case, to a poison introduced through the lungs, and the general system is invaded before confinement, of course neither intra-uterine injections nor curette is admissible. If, too, the infection comes from an inflammation or suppuration in the tubes, which may have been latent till the irritant and traumatism incident to parturition takes place, these two curative agents are not indicated. But if they can be excluded, we must look along the genital tract for the place through which the infection has taken place. If no abrasions are found, and the odor does not disappear with the ordinary vaginal douches, then, it appears to me, we must look to the cavity of the uterus.

If, then, we have a temperature of 103°, and a bad odor, the indications are to wash

out the uterus. If the bad odor continues, and the temperature is not reduced after a fair trial with the intra-uterine douche, then the curette should be used.

### THE OPERATION.—INTRA-UTERINE INJECTIONS.

I have, in the first place, a piece of good-sized rubber tubing, one end of which is provided with a sinker, and the other with an apparatus for regulating the amount of fluid running from the tube. An appliance may be placed upon the tube which will catch upon the side of the pail or pitcher, and serve to keep it in place. The intra-uterine tube is of glass, about fourteen inches in length, somewhat smaller at the uterine point, grooved on the front and back, with good-sized perforations. The operation is best done if the patient is placed upon a table, with an oilcloth under her extending to a slop jar on the floor, so that all the fluid shall run into this receptacle. The external genitalia should be made thoroughly aseptic, then the vagina should be thoroughly douched, and the speculum introduced. The uterus may now be pulled down with the vulsellum and an intra-uterine douche given. There is no rule that can be given in regard to the amount of fluid which should be used at each time, but each operator must judge for himself. Carbolized water should usually be used. Injections of bichloride solutions in the uterus at full term have been followed by mercurial poisoning, and it is not now regarded as good practice to use this agent. If, for any cause, it should be used, the cavity of the uterus should be washed out with pure water, to rid it of the mercurial salt. The operation may be concluded by the introduction into the uterine cavity of a suppository of iodoform, containing from fifteen to seventy-five grains. Experience has taught us that it is safe to use as high as seventy-five grains. Any amount above that may be followed by symptoms of iodoform poisoning. If, at this or any subsequent time, it is deemed advisable to curette the uterine cavity, the same steps in the operation are taken, including at first an intra-uterine douche, to clear out all the septic material that is possible, and then using the curette.

### CURETTING THE UTERUS.

The instrument that I have been in the habit of using is twelve and one-half inches long. It is not flexible, although I am not certain but that the instrument would be improved for some cases if it was. Its operating end is provided with a dull fenestra about three-quarters of an inch in diameter. A little experience usually teaches one where to find the site of the placenta, over which the curette is drawn, using, of course, only a small amount of pressure. After this is completed, the instrument may be passed around until the entire uterine cavity has been carefully, but entirely, scraped. This being completed, a very large uterine douche should be given, and then an iodoform suppository introduced. In several cases the temperature has gone down within a very short time, and the patient made a recovery without a single bad symptom. A coil placed over the abdomen is a very valuable adjunct to be used immediately after this operation, when the temperature is high, and it is also an important agent to prevent any inflammatory action which might follow the operation. In part of the cases I am in the habit of giving an anæsthetic, but in others the patient stands the operation well without this agent.

# THE PREVENTION OF PUERPERAL FEVER.

## PRÉVENTION DE LA SEPTICÉMIE PUERPÉRALE.

## DIE PROPHYLAXIS DES PUERPERALFIEBERS.

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Puerperal fever has long been regarded as a malignant and contagious affection. It has also been considered a sporadic as well as an epidemic disease, which has existed in all countries, and has carried away a large percentage of its victims. Nevertheless, it belongs to a class of contagious affections which are now known to be preventable. Our object, therefore, is to point out some of the means which may be used, not only to abate the frequency of puerperal fever, but to give prominence to the thought that it may be entirely prevented.

In the discussion of our subject we must be permitted to make free use of the history of the disease, which has come down to us in two separate lines. The first of these, we may say, began in the traditions of a remote period, and has reached us through many centuries. The second, beginning at a much later period, has run parallel with it. We refer to domiciliary practice and to hospital practice. In the former, as every practitioner is aware, we have but a limited control over the patient; in the latter we have entire control. Hospital practice should, therefore, give better results than home practice.

The literature of the disease is not only extensive, but it contains a great diversity of opinion, especially in regard to its source, nature and propagation, and here it may be proper to notice how this diversity of sentiment came about.

Until recently, our profession had a very meagre acquaintance with human anatomy, human physiology, organic and inorganic chemistry and pathology—therefore, the basis of our science—and those whose opinions were expressed twenty-five years ago on infectious diseases were not in possession of the numerous appliances which are now considered necessary for accurate observations. The microscope, that most valuable of all instruments in medical science, was scarcely known to the profession a quarter of a century ago. With it, much that was dark and mysterious has been made clear, doubts have been removed, and we are now in position to speak with much greater assurance than those who preceded us.

But there was another reason for this diversity of opinion besides that of a want of knowledge. Men in all departments of activity have been controlled to a greater or less extent by what is called expediency or policy; and so it has been in medicine. As far back, at least, as the Mosaic period, there was a suspicion that an invisible contagium might be carried about among the people; but for the physician, the midwife, the nurse or the undertaker, in ancient times, to have made an effort to prove that an infectious disease could be carried from house to house, notwithstanding the ablutions usually practiced, would have been at the risk of their occupation; and so the centuries of doubt, ignorance and superstition passed along.

But when the light of science began to shine upon the nations, and when men began to express their convictions on all subjects in which the people were interested—political, religious and scientific—there was more than a suspicion that a contagium might be carried about by those who were not themselves affected thereby; especially was there a belief that the accoucheur could carry with him the germs of disease into the lying-in chamber. Facts which could not be explained on any other hypothesis accumulated, and there were brave men in those days who volunteered to furnish the evidence, even if it implicated themselves.

Then came an era of plausible theories, arguments and explanations; old theories were revived and new ones were invented; but all admitted the epidemic character of the disease, which relieved not only the nurse, but the accoucheur, of the frightful responsibility of being a contagion bearer. As a result, the greater part of the profession, which is always conservative, endorsed the theories. The majority, as at present, preferred a lucrative practice to the advancement of medical science. The busy obstetrician jogged along on horseback or in his gig, half asleep, and well satisfied if his losses from puerperal fever did not exceed five per cent. of all his cases of confinement. He preferred to believe, with the majority, that the infection was somehow or other connected with the movements of the atmosphere or the changes of the moon.

In the meantime, lying-in hospitals for the poor and the unfortunate were established in all the larger cities of Europe and of this country, and thousands of women lost their lives in them who would, no doubt, have escaped had they been permitted to give birth to their children in the faubourgs and alleys. Thus, another argument was furnished, that the disease was not only malignant, but in a high degree contagious. To some it became more apparent that the accoucheur and the nurse were the instruments of its propagation; but to others there seemed to be room for doubt and explanations which placed the responsibility upon a mysterious agency, unknown and unknowable.

With these general remarks we approach a step nearer to our subject. And first let us notice some of the theories referred to, as well as the means which were used for its prevention. Hippocrates, Galen, Ambrose Paré, Sydenham and their cotemporaries taught that puerperal fever was caused by a suppression of the lochia. This doctrine was accepted during a period of twenty centuries. It implied absorption and, of course, blood poisoning. During this long period ablutions were common, and while there was a belief that the affection was sporadic, there was also a belief that it was epidemic, and was somehow carried in the atmosphere.

In 1686, Puzos started the theory that milk circulated in the blood of pregnant women, and that, by a process of metastasis, it affected the uterus after parturition. This doctrine was accepted in France, England and Germany, and, indeed, everywhere, until the close of the eighteenth century. Hence, we have the idea of milk fever still floating in the minds of the people. During this period the ordinary ablutions were used; but the popular belief still remained that the disease was epidemic, and was carried in some way through the atmosphere, which must be excluded from the sick room.

In 1801, Bichat, of Paris, demonstrated that the milk-like fluids found in the abdominal cavity of women who died in childbed could also be found in the cadavers of men and of non-puerperal women. At the same time he pointed out the fact that in women who died of puerperal fever there was, first of all, an inflammation of the uterus which often extended through the tubes and over the peritoneum; that it sometimes followed the course of the blood vessels, and at other times the course of the lymphatics. A new theory was then set up, the central idea of which was that of a local inflammation, which sometimes spreads rapidly through the entire system. Hence, we find in the literature of this period such terms as metritis, metro-peritonitis and puerperal phlebitis.

Meanwhile, lying-in hospitals were established, and the idea that puerperal fever was an epidemic disease gained strength. Maternities were constructed after the style of prisons; ventilation was not understood, and the ablutions that were practiced seemed to be of little account.

Then followed half a century or more of conflict of opinion and chaos, blood-letting and blistering and an increase of mortality. We read the history of puerperal fever during that period with a degree of amazement and incredulity. To the old theories new ones were added; and other kinds of treatment, prophylactic and remedial, were

suggested, but the mortality seemed only to increase. Some of the maternities were renovated and remodeled, others were torn down and rebuilt, but the plague returned. Disinfectants were used, such as chlorine water and the chloride of lime; the walls and ceilings were whitewashed, but in many cases without perceptible advantage. The subject of disinfection, and that other equally important subject, ventilation, were not understood. The cottage plan of hospitals was proposed, and it was even suggested that laws be enacted to suppress the maternities, and to prevent others from being erected.

Not only was there great ignorance shown in the construction of hospitals, and in the application of the means necessary for the prevention of contagious diseases, but there was a great abuse of medicine during this period. It was an age of heroic practise. Blood-letting, blisters, emetics, purgatives, and even stimulants and opiates were used in a way that we now consider extravagant. Domiciliary practice needed defence, for it was astonishing what a mortality followed in the tracks of many eminent obstetricians. This was noticed especially by those who were not connected with medical schools, or with dissecting rooms, or were not crowded with work. Hospital practice also needed defence; for it was agreed on all hands that the maternities were the centres of the so-called epidemics. The teaching of the obstetrical art seemed to require their existence, and the important question was how to abate the evils associated with the maternities and still retain them.

It was, therefore, necessary to make other explanations; accordingly, results were taken for causes, and theories were piled upon each other in confusion. Metritis, perimetritis, puerperal phlebitis, and afterward pyæmia and septicæmia, were discussed as causes. There was also a theory that puerperal fever is associated with erysipelas, typhus and typhoid fever, and that the former is caused by the latter.

In this period there was now no longer any doubt that the disease was contagious, but how was the *materies morbi* conveyed from one patient to another? The evidence furnished by domiciliary practice was cumulative, and carried with it the conviction of a demonstration, that the accoucheur and the nurse were chiefly responsible. But the evidence furnished by hospital practice left room for doubt in the minds of many who had charge of the hospitals. In some of the maternities in which disinfectants were used and great care was exercised the percentage of cases was very small, while in others the cases were numerous, and the mortality so great that the disease was considered epidemic. The old belief that it was conveyed by the atmosphere was still adhered to, and consequently no one could be considered responsible.

The percentage of losses by puerperal fever can only be approximated. In domiciliary practice it is especially difficult to reach anything like accuracy, though we may suppose that in the case of any practitióner his losses have rarely exceeded five per cent. of the confinements. There are very few practitioners who can say that they have not had two per cent. of losses by this disease. In the maternities there were often one-fourth or one-third of the women sick with the fever, and the mortality not unfrequently reached ten, twelve or fourteen per cent. of the cases admitted during the month.

In these circumstances, in 1847, a man of unusual courage appeared in the arena. Semmelweiss, at this time only an assistant in the great hospital of Vienna, announced a new doctrine. The result was that he became the object of much criticism. Had he been an older man, he would possibly have hesitated, but he was not trammeled with preconceived opinions, and it mattered little to him whose reputation suffered, so that the truth was evolved. His observations, like those of Galileo, amounted to a demonstration. He had seen the disease spread in the lying-in wards, from a case of carcinoma uteri, and likewise from a carious knee. He had compared the small percentage of cases of puerperal fever in the wards into which the medical students were not admitted

with the large percentage of cases in the wards into which they were admitted, and, to his mind, the demonstration was complete. The disease, he said, was one of putrefaction; the students carry the contagion from the dissecting room.

Let us hear what this brave man says in his work on "The Etiology, Nature and Prophylaxis of Puerperal Fever," published in 1861.

"The experience which I have acquired during the last fifteen years' attendance in three different lying-in hospitals, in all of which puerperal fever prevailed in a high degree, convinces me that puerperal fever is, without any exception, a fever of absorption, arising from the absorption of decomposed animal organic matter. The first consequence of absorption is decomposition of the blood, and the consequences of decomposition of the blood are exudations.

"The decomposed animal organic matter which, when absorbed, causes puerperal fever, is, in by far the greater number of cases, communicated to individuals from without, and this is infection from without; these are the cases which exhibit puerperal fever epidemics, and these are the cases which can be guarded against.

"One source from which the decomposed animal organic matter is taken, and which when communicated to individuals from without produces puerperal fever, is a dead body, of whatever age or sex, no matter what the malady was of which the individual died. It is also indifferent whether it be, or not, the dead body of a woman who died in childbed. It is only the degree of putrefaction which is of consequence.

"A second source from which the decomposed animal organic matter is taken are sick persons, with or without suppurating wounds.

"A third source is that of the normal plexus lochialis.

"This decomposed animal organic matter may be and generally is conveyed to the patient by the finger of the examiner, the hand of the operator, surgical instruments, bedclothes and sponges, and it may even be conveyed by the atmosphere of hospitals."

This theory did not appear to be so plausible to the cotemporaries of Semmelweiss as it does to us, and hence it was opposed and even ridiculed. It was too sweeping—too radical—to be accepted by the older members of the profession who had expressed themselves on the subject. Besides, it condemned their practice, and made the profession responsible for the so-called epidemics which prevailed in nearly all the cities of Europe and of America in which there were maternities.

Semmelweiss also observed, in his fifteen years of service, that cases of tedious labor were almost certain to die of the fever, and he could see no other reason for this mortality than the numerous digital examinations made by the students, fresh from the dissecting rooms. He also noticed that a large proportion of the children of women subjected to this treatment died with symptoms very similar to those of their mothers.

Unfortunately for Semmelweiss, he did not live to see his theory generally adopted, or even respected. But there were some who recognized the value of his labors. In 1862, Bednar, then First Physician of the Foundling Hospital of Vienna, says: "The sepsis of blood in new-born children has now become a great rarity, which we attribute to the happy discovery of Semmelweiss, formerly Assistant Physician of the Lying-in Hospital at Vienna, who has successfully discovered the cause and the means of preventing puerperal fever, formerly so destructive in the hospital." The principal means which Semmelweiss suggested was thorough washing, on the part of the attendants, in chlorine water. His treatment required, first of all, scrupulous cleanliness.

About this time a report was made by Denham, Master of the Dublin Lying-in Hospital, which professes to give both sides of the subject, in 1862. His paper, which appears in *Braithwaite's Retrospect*, was really a defence of his plan of treatment in the hospital during one of the most serious epidemics that had occurred in it. Denham had just returned from a visit to Paris, Munich and Vienna, and it is very evident that he reached Dublin without an additional ray of light on the subject. The contagion of

puerperal fever, and how to modify it, was the main point in the discussion. At the head of the first list of authors he placed Semmelweiss, and gave the three sources of contagion which are so clearly set forth in his work. Next to him he placed Prof. Simpson, of Edinburgh, who, in 1851, published a pamphlet "On the Analogy between Puerperal Fever and Surgical Fever." On this and other occasions Prof. Simpson compared the uterus after parturition to an amputated limb, liable to become the seat of pyæmia or septicæmia. He also had the courage to make the statement, and to support it by evidence, that the accoucheur and the nurse are chiefly responsible for the propagation of puerperal fever. At the head of the second list of authors he placed Meigs, of Philadelphia, who had become distinguished for his heroic treatment of puerperal fever, and for his opposition to the views of Semmelweiss. At present we read his chapter on "Puerperal Fever" with astonishment. Then follows Meeker, of Munich, and Braun, of Vienna, who is represented as saying that the theory of Semmelweiss has been completely upset by a recent epidemic in the old hospital.

Another theory that was introduced during the closing years of this period, we may mention. It regards puerperal fever as an *essential* fever, as much so as typhus or typhoid. It takes but little account of *local* symptoms, such as metritis, peri-metritis and metro-peritonitis. Fordyce Barker, of New York, in his able work on "Puerperal Diseases" has given to it a degree of prominence which I am inclined to believe it does not deserve.

Looking over the history of this recent period of puerperal fever, we are surprised at the amount of ignorance displayed in regard to the prevention of infectious diseases. Even the advantages of pure air and the blessed sunshine, so abundantly provided, were not understood. The maternities were closed, so that the contagion might not enter. Nevertheless, there was some advancement in sanitary science. In the drainage of cities, in the erection of public buildings and in the use of disinfectants, there were many useful suggestions made. At this time, about twenty years ago, the percentage of losses from infectious diseases had reached its highest point.

This brings us to consider very briefly what may be called the Germ period of puerperal fever. The chaotic condition into which this branch of medicine had fallen was very discouraging. With all the advancement that had been made in other branches of medicine, in this one alone there seemed to be a gradual rise in the mortality. Fortunately for mankind and for our profession we can now make a more favorable report.

In 1870 it was my good fortune to visit the Royal Infirmary in Edinburgh, and to become acquainted with Prof. Joseph Lister. The whole institution smelled of carbolic spray and antiseptic dressings. He had begun the treatment of compound fractures in Glasgow, in 1865, by converting them, as he said, into simple fractures; and now he was astonishing every one who had the honor of making his acquaintance.

It was also my fortune to spend the winter of 1870 and 1871 in the Siege of Paris, where there was nothing said of antiseptic surgery, though every means known to the profession on the Continent were used to prevent the spread of contagion.

The next winter I spent in Vienna, where there was likewise nothing said of antiseptic surgery, or the theory and practice of Semmelweiss.

In the *Medical and Surgical Reporter*, of Philadelphia, 1876, there will be found a brief controversy between Dr. R. J. Levis and myself, which will show that no prominent surgeon in the United States had yet adopted Listerism.

Of Semmelweiss, we may say that his theory and practice were beginning to be quietly accepted, though his name was seldom mentioned. He was a Hungarian and from Pesth, and this was sufficient. Had Hecker and others who criticised him severely adopted his suggestions in regard to the use of antiseptics, they would not have witnessed so frequently what they called epidemics.

We have no disposition to enter into a discussion of the so-called germ theory of

disease, or to apply it to puerperal fever. Our duty is to indicate the means which may be used to prevent it. We may say, however, that the blood which flows from a healthy mother at parturition is as pure as that which flows from the amputated limb of a healthy soldier. Septicæmia, if it follows, must be the same in the one case as in the other. It is what the obstetrician and the surgeon equally dread; and the treatment or means of prevention, so far as they can be employed, must be the same.

If I have studied the teachings and practice of Semmelweiss to advantage, there must be at the bottom of his theory what may be called obstetrical cleanliness, as there is the idea of surgical cleanliness at the bottom of Listerism. The former, in referring to the three sources of "decomposed animal organic matter," which he so clearly sets forth in his work, says: "It is only the degree of putrefaction which is of consequence." He did not appear to regard the putrefaction of animal matter as anything else than the work of disintegration, by which, however, there is a virus generated capable of producing sepsis or septicæmia.

On the other hand Prof. Lister, following the teaching of Pasteur, says in substance: "There are germs in the atmosphere; these, coming in contact with denuded or inflamed surfaces, produce bacteria, which in favorable circumstances multiply rapidly, set up fermentation and putrefaction; and the bacteria being absorbed and carried into the blood, produce septicæmia.

Whether we adopt the former theory or the more recent one, the treatment of the disease is the same, and the means to be used for its prevention are likewise the same. These are internal and external, or perhaps, more properly speaking, therapeutic and hygienic. But before we refer to them, a few remarks may be made upon what we have called obstetrical cleanliness.

The general practitioner who uses only water and soap as a wash for his hands and body is never a safe man in the lying-in chamber. We cannot say that he is obstetrically or surgically clean; and the man who has a chronic nasal catarrh is especially an unsafe accoucheur. The contagion of this fever may originate equally in the king's palace and in the beggar's hovel. On the other hand, it may be carried into one as easily as into the other. Paradoxical as it may appear, the parturient female, the midwife and the nurse may not have used a wash of any kind for a month, and yet be obstetrically clean. To illustrate: I have seen a county jail, in which there were, in addition to the usual number of prisoners, from one to two hundred vagrants or tramps, male and female, filthy, tuberculous and lousy, with sore legs and feet, crowded together and breathing the same foul atmosphere; and in these unpromising circumstances I have known at least twenty-five children to be born, and not one of the mothers suffered with puerperal fever. Was it because there was very little assistance rendered by the doctor? Possibly so. I have also known several medical gentlemen who have never used anything else regularly as a wash for their hands than water and soap, and they have had cases of puerperal fever every year; and one of them lost three cases in twenty-four days. I have always kept a disinfectant on my washstand, and I have never lost a case by puerperal fever. This experience and the history of the disease lead me to the conclusion that it has no necessary connection with common filth or dirt.

Here we may notice another point. Puerperal fever is evidently sometimes an autogenetic disease, but it would be a mistake to assume that it is frequently so. The conditions do occasionally exist to produce the fever. We may regard them as constitutional and predisposing as well as circumstantial, including the environment of the patient. But in the greater number of cases, in all countries, the disease is heterogenetic. It is conveyed to the female by the hand or finger of the medical attendant or by the nurse.

The preventive means which we desire to suggest and insist upon are equally suited, with slight modifications, to domiciliary and hospital practice. We give them in the order mentioned.

First, Internal or Therapeutic. The accoucheur has generally a few hours in which to prepare his patient for the time when septicæmia usually sets in; and to allow these hours to pass by in a careless and indifferent manner, I now consider criminal. It has been my practice to immediately commence the administration of certain drugs which I believe are in some measure antiseptic. The three which I name in the order of their importance are the proto-chloride of mercury, sulphate of morphia and ipecacuanha. I use them and recommend them in small doses or in larger quantities, as the condition of the patient indicates, and until the danger of septicæmia has passed. Other remedies may, of course, be added, but these I regard as indispensable.

Second. The External or Hygienic means are known by various terms, as antiseptics, germicides and disinfectants. The bichloride of mercury, carbolic acid and the chloride of lime are among the best. The last named, for the purposes of the accoucheur, is convenient and excellent. We should remember that it is not the pregnant woman who needs the antiseptic wash. The tramp on the wayside, the gipsy woman and the king's daughter are all equally free from the contagion at the moment of parturition. It is the medical attendant and nurse who are in need of the antiseptic wash and brush. In nine cases out of ten they are the contagion bearers.

The accoucheur should remove the secundines carefully and without delay. When the placenta is adherent there is a propriety in using an antiseptic ointment on the hands, and means should be used to secure a firm contraction of the uterus. In cases of rupture of the perineum, an antiseptic ointment or wash may be used. The mother should be made as comfortable as the circumstances will allow. The temperature of the room or hospital should be moderate and an abundance of fresh air should be admitted. No other wash is usually needed than water and soap. As a deodorizer merely, a weak solution of the permanganate of potash may be used upon the clothing.

It will be noticed that I am not one of those who believe in the uterine douche. In domiciliary practice it would certainly be an unpopular and impracticable procedure. The unskillful nurse could not be trusted with it; besides it is a dangerous, and we may say, except in extreme cases, a useless procedure. An antiseptic wash, unless it comes in contact with the corrugated folds of the intra-uterine surface, would be of very little advantage. This would imply a certain amount of uterine distention, which would force the secretions, and possibly the septic matter, into the open blood vessels and tubes. In hospital practice this procedure cannot be so objectionable, as there is always a skillful physician at hand, as well as an educated nurse.

In conclusion, allow me to refer to the recent very gratifying results of what may be called antiseptic obstetrics, which means simply the prevention of puerperal fever. The statistics of the great hospitals in Vienna are a sufficient vindication of what we have endeavored to advocate in this paper. During the year 1823, when the medical students of the University were required to dissect and make post-mortem examinations, the mortality rose to 7.5 per cent., and continued to rise until 1842, when it reached 15 per cent. Every sixth or seventh woman died of puerperal fever. In 1847 Semmelweiss introduced his rules for disinfecting hands, instruments, etc., and the next year the death rate fell as low as 1.3 per cent. But with the recent use of antiseptics and the most careful management, the average number of births annually being above 10,000, the mortality rate in 1882 fell to 0.75 per cent., and still more recently, under a system of hand washing, to the extent of "damnable iteration," as one writer puts it, the disease has almost entirely disappeared.

In the new hospital at Prague, which is a masterpiece in its hygienic arrangement,

the death rate has been brought down to less than one-fourth of one per cent. Thus we see how a malignant and infectious disease, which for many centuries was regarded as an epidemic, may be almost entirely suppressed.

An invitation from Dr. J. J. Murphy to the members of the Section, to visit Columbia Hospital, was read.

During the sessions four hundred members were present.

Adjourned at six o'clock.

# FOURTH DAY.

THURSDAY, September 8th.

Professor SIMPSON in the chair :—

## FIEVRE TYPHOÏDE SURVENUE PENDANT L'ÉTAT PUERPÉRAL ET TERMINÉE PAR GUÉRISON.

### TYPHOID FEVER SUPERVENING ON ACCOUCHEMENT—CURED.

### ABDOMINAL-TYPHUS IM WOCHENBETT IN GENESUNG ENDIGEND.

Observation presentée au Congrès

PAR LE DR. EMILE POUSSIÉ,

De Paris, France.

Au mois de Juillet, 1886, Madame X., de Paris, agée de 26 ans, sans profession, accouchait d'un enfant à terme du sexe masculin. L'accouchement se fit naturellement sans intervention aucune. Les suites de couche furent normales jusqu'au 7e jour, c'est-à-dire jusqu'au 7 Juillet. Ce jour-là, on vint me réveiller de grand matin, Madame X. ayant vomi plusieurs fois dans la nuit. A mon arrivée, on me dit que la malade avait eu trois vomissements, on me présenta dans un vase les matières du dernier vomissement qui étaient vertes et porracées. La langue était humide et couverte d'un enduit blanchâtre. Ma première idée fut celle d'une péritonite commençante d'autant plus que les traits de la malade étaient tirés ; mais le ventre était souple, non-douloureux aussi bien spontanément qu'à la pression ; l'écoulement vaginal continuait à se faire dans les mêmes conditions qu'auparavant sans que l'odeur en fut changée; enfin il n'y avait presque pas de fièvre, puisque la température était de 37°, 9 centigrad. et que le Pouls battait 80 fois par minute sans changement notable dans sa plénitude ni sa force.

Je réservai donc le Diagnostic, mis la malade à la diète et lui ordonnai de boire de l'Eau de Seltz glacée, par petites gorgées. Ce jour-là, 7 Juillet, il y eut encore deux vomissements dans la journée.

8 Juillet. Un seul vomissement ; la température donne 38°, 4.

9 Juillet. Les vomissements cessent, mais la Température s'élève ; Thermomètre 39°, 3 c. ; Pouls 104 fois par minute, la malade accuse de la Céphalalgie. Je fais cesser l'usage de l'Eau de Seltz glacée et prescris du bouillon.

10 Juillet. Les vomissements ont définitivement cessé. Th. 39°, 8 c. ; Pouls 112 fois par minute; il est légèrement dicrote, la céphalalgie augmente, subdelirium nocturne, insomnie, la langue commence à se sécher, les traits se tirent davantage. En présence de ces symptômes je pense à la possibilité d'une fièvre typhoïde et prescris la potion de Todd et 2 grammes de sulfate de quinine à prendre en deux fois, 1 gramme le matin et 1 gramme le soir.

11 Juillet. Les symptômes constatés la veille persistent; Thermomètre 40°, 2 c. ; le Pouls 120 par minute et d'un dicrotisme marqué; légère diarrhée couleur ocre.

12 Juillet. Apparition de 2 taches rosées lenticulaires sur l'hypochondre droit, mêmes symptômes que la veille; de plus on constate un peu de gargouillement dans la fosse iliaque droite qui est légèrement sensible à la pression; la langue est complètement sèche.

13 Juillet. Les taches rosées sont au nombre d'une douzaine sur le ventre; mêmes symptômes que la veille. A la percussion la rate paraît tuméfiée, mais il est impossible de le percevoir nettement. Les traits de la face sont tirés.

En présence de ces phénomènes le doute n'était plus possible, je diagnostiquai Fièvre typhoïde et continuai à prescrire la potion de Todd et le sulfate de quinine, 2 grammes par jour jusqu'au moment où la fièvre tomba.

A partir de ce moment la malade offre le tableau de la fièvre typhoïde vulgaire à forme commune.

La maladie se termina définitivement le 19 Août, jour où la température vespérale ne fut pas plus élevée que celle du matin. Sa durée fut donc de 41 jours. Convalescence normale sans accident; et jusqu'à présent Madame X. n'a présenté aucun trouble dans sa santé; remarque importante, car il n'est pas rare de voir plusieurs mois après la cessation de la fièvre typhoïde les anciens malades être quelquefois atteints de divers accidents, parmi lesquels la tuberculose pulmonaire, génitale ou localisée ailleurs occupe le premier rang.

Cette observation pourrait donner lieu à plusieurs considérations théoriques et même de doctrine, mais je me contenterai de faire remarquer :—

1° Le développement de la fièvre typhoïde pendant l'état puerpéral.

2° Le début abnormal de la maladie qui au premier abord pouvait faire croire à une péritonite commençante.

3° La forme de la maladie qui a revêtue la forme commune, et n'a offert qu'une gravité moyenne, bien que s'étant développée pendant l'état puerpéral.

4° Non seulement la maladie guérit, mais la maladie n'eut aucune suite fâcheuse.

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# PHLEGMASIA ALBA DOLENS.

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BY L. CH. BOISLINIÈRE, M.D., LL.D.,

Emeritus Prof. of Obstetrics St. Louis Medical College; Consulting Physician to the St. Louis Female Hospital, and the St. Ann Lying-in Asylum.

On account of its always painful and occasionally dangerous character, this affection is entitled to a special study on the part of the obstetrician.

But it is to be regretted that the etiology of this disease is involved in such uncertainty that it has become necessary that further studies of the subject should be entered into in order to refute or conciliate the many different opinions emanating from the great authorities who have treated of this disease.

Few diseases, says Leishman, have had a greater variety of designations, and they form an epitome of the various pathological theories.

For instance, Lee, Rokitansky and Moxon say it is inflammation, while Virchow,

Hewitt and Barnes deny it. Denman, Puzos and Levret took it to arise from a depot of milk; Van Swieten, Lieutard and Sell a milk metastasis, so did Mauriceau and Callisin. Jameson thought the condition a peculiar inflammation in which water was effused; Hull and Frazer, a peculiar inflammation seated in the muscles, cellular membranes and inferior muscles of the skin.

Disturbance of the circulatory system begins to be recognized later; for instance by Meigs, who calls the disease a cruel and very dangerous inflammation of the veins; McClintock and Hardy, a phlebitis; Meigs, a crural phlebitis; Stamnius, an inflammation of the femoral and iliac veins giving rise to all the phenomena of phlegmasia dolens. Dunglison thought that pressure of the gravid womb obstructed the flow of blood, the serous part is thrown out into the cellular membrane. Watson puts inflammation of the femoral vein, obliterating its cavity, as the essence of phlegmasia dolens.

Tyler Smith believed in blood poisoning as a cause and allied to puerperal fever, so much so, that the patient who had phlegmasia had made a narrow escape from puerperal fever. McKenzie and Hervieux say there is puerperal toxemia, and phlebitis of the crural vein is a sequence. Trousseau taught that it is an extension of inflammation from the uterine sinuses. Velpeau, in 1826, published cases demonstrating the propagation of the inflammatory process from the uterine to the iliac veins. Barnes denies this. Playfair looks upon the disease as a local manifestation of a general blood dyscrasia.

Authorities could be quoted *ad infinitum* in proof of the uncertainty reigning in the etiology of the affection.

However, the most probable and most generally accepted opinion is, that this affection is produced by an occlusion of some of the veins of the lower extremities, the crural and the tibial and perineal veins (Lusk).

What causes this coagulative phlebitis? Simpson says it is inopexia or some morbid condition of the lining membrane of the veins. Andral, Gavarret, Becquerel and Rodin considered it caused by hyperinosis. This is a most probable cause, as it is known that there is considerable increase of fibrin in the blood of the pregnant woman, and this will explain the obstructing venous thrombosis. This excess of fibrin also favors the arrest of post-partum hemorrhage.

Barker, adopting Playfair's view of a general blood dyscrasia, looks upon thrombosis as of service, that it is one of the conservative efforts of nature to protect the general system, not to let loose the poison.

Another cause of this affection may, according to some authors, exist in a pathological condition of the lymphatic system characterized by inflammation and obstruction of the lymphatic vessels. Tilbury, Trox and Duncan believe that it always exists, that it is the most important etiological factor, the glands and lymphatics of the limb being the parts first affected. Virchow and Klob have described a peculiar lesion—a puerperal lymphatic thrombosis. In fact, during the course of the disease the lymphatics often can be seen like red streaks, and feel like hard cords along the course of the limb.

Therefore, one of the causes of phlegmasia dolens is a puerperal lymphatic thrombosis, generally coexisting with a venous thrombosis, arrest of circulation and effusion following.

But if phlegmasia dolens be generally considered now as a phlebitis, we must acknowledge, says Charpentier, that "it is a phlebitis of a peculiar nature, and, although depending on the puerperal state, it differs essentially from other phlebitis and particularly from uterine phlebitis."

However, it cannot be denied that the chief factors in producing the disease are thrombosis of the venous, and occasionally of the lymphatic systems. This explains the swelling, pain, œdema and mode of resolution of the disease.

*Symptoms.*—In the majority of cases, without premonition, and within ten to twenty-five days after confinement, the disease begins to manifest itself, first by pain of a dull, heavy character, located at first usually, as observed by Meigs, in the calf of the leg. This pain, increased by pressure, in a short time assumes an acute character, and the whole limb soon becomes invaded and gradually swells, sometimes to an enormous extent. It is before this swelling has progressed, that red streaks on the course of the lymphatic vessels can be seen, and hard cords corresponding to the directions of the inflamed veins can be felt. After the œdema of the limb has progressed to a great extent, the above signs cannot be ascertained any longer. The skin then becomes of a milky whiteness, hence the name milk leg, given to it by the vulgar. It becomes also shining, smooth and almost transparent. With the appearance of the swelling the pain becomes less acute, and assumes the dull character it had at first. This stage is often accompanied with some degree of fever.

In primary thrombosis the swelling, says Lusk, usually begins at the ankle and spreads rapidly upward to the inguinal region; in secondary thrombosis, extending from the uterine sinuses, the swelling travels from the inguinal fold to the ankle.

In this disease recovery is slow, as a rule, requiring several weeks, and in some cases never taking place entirely. I have two patients who are still lame after, respectively, three and ten years. The latter will probably have to walk with a cane the rest of her life.

*Danger of Sudden Death.*—It is great, but rare, and caused by a migratory thrombosis detached from the obstructed vein, and reaching the right side of the heart and lodged in the pulmonary artery. This accident is caused by the patient rising too soon, or after a sudden exertion indulged in at the period of the disintegration of the venous thrombosis. Hence the great caution to be recommended to patient during convalescence.

The Duchess of Nemours, one of the daughters of King Louis Philippe of France, fell dead while stepping quickly in her carriage, six weeks after confinement. Had had a moderate attack of phlegmasia. The autopsy revealed loose clots in the crural veins, and an obstructing embolic clot in the right side of the heart.

I was suddenly called to the house of a lovely young woman, who fell dying in my arms as I entered the room; she gasped a few times for breath and suddenly expired. She had got up after a light attack of phlegmasia, three weeks after her confinement.

Virchow has found the upper and floating portions of some of these venous plugs so loose that they were separated by succussion of the dead body. Hence, we need not feel surprised at sudden alterations in the position of the patient, or sudden muscular exertions, apparently detaching portions of them, as in the above instances.

Another, but rarer danger arises from arterial obstruction in the puerperal state, followed by gangrene of the limb, necessitating amputation. I have a personal knowledge of two of such terminations of attacks of phlegmasia dolens. One a young, healthy primipara, after a severe labor, adherent placenta, puerperal septicæmia, phlegmasia dolens, followed by cessation of pulsation at the femoral artery and its branches, gangrene of the lower extremity, amputation at middle third of left leg; recovery. The other case with about the same history; amputation, recovery.

These are, fortunately, rare terminations of phlegmasia. The conditions for this complication to be found in certain peculiarities of the blood of the puerperal female, such as hyperinosis, etc.

I leave this question for the investigation of surgical pathologists.

The treatment of phlegmasia dolens is on general principles: elevation and immobilization of the limb, hot vinegar fomentations (Meigs), anodyne embrocations or mercurial and belladonna ointment. And as soon as pain has subsided, a smooth

application of a Martin rubber bandage. After disappearance of fever and œdema allow patient to rise very cautiously, and wear for months and years a long elastic stocking. In case of fever the usual antifebrile treatment.

DISCUSSION.

Prof. SIMPSON thought it a subject of congratulation that Dr. Poussié had brought forward this case in connection with the discussion on puerperal fever. It was important to observe that there might be many varieties of fever occurring in puerperal women. Dr. Poussié's case illustrated the possibility of the occurrence of typhoid fever setting in during the puerperium, and such cases might be met with in all ranks of the community wherever pregnant and lying-in women occupied bedrooms open to the invasions of sewer gases. But sometimes women recently confined have been said to die of puerperal fever who have been the subject of some of the other zymotic fevers. The danger of scarlatina to puerperæ was well known, and he has seen a patient die three days after labor, of measles. The papers which had been brought before the Section dealt, however, more directly with the febrile condition of the puerpera resulting from the introduction of septic matter into the system and resembling more or less the febrile condition set up in surgical patients after wounds and injuries. What the nature of this poison might be, how it was introduced into the system, whether only through the genital tract at the hands of the attendants, or also through the atmosphere, and how its ravages could best be met, were the kind of questions that were now open for discussion in the Section.

Dr. GRAILY HEWITT, London, Eng., felt privileged in offering a few remarks on the subject of puerperal fever. For some years he had entertained the opinion that, as regards puerperal fever in private practice, defective contractions of the uterus is largely responsible for its occurrence. This defective contraction is due generally to weakness. It should be prevented by fortifying the patient by good food during pregnancy, by careful feeding after labor, and measures adopted to secure good contraction. He would not allude to the disease in lying-in hospitals, in which so much benefit had followed the antiseptic methods introduced of late years. His remarks went chiefly to the preventive question, and he regarded the uterus as the part of most importance from that point of view. As regards intra-uterine injections, he was in favor of using a double-current tube for the purpose. Such a treatment was very valuable if the disease be not too far advanced; it was of little use if the morbific germs and their effects had extended to the cellular tissue around the uterus or the peritoneum. He stated that he approved of the principle of Budin's celluloid instrument, exhibited at Copenhagen in 1884. One of glass, on the same principle, he had hoped to exhibit at this meeting, but it had been broken in transit.

As regards treatment of the disease, he had found greatest benefit from upholding the nutritive action coupled with copious stimulation. He related a case in which a woman who was hourly expected to die, for two days, in a lying-in hospital, a case of the worst kind, recovered after taking a bottle and a half of brandy in the twenty-four hours.

Prof. WILLIAM S. STEWART, Philadelphia, remarked that he wished simply to add his testimony in favor of the care recommended by Prof. Graily Hewitt, in first seeing to it that the uterus is thoroughly emptied and contracted, and that careful sanitation receive attention. See to it that the nurse is free from indolent sores, etc. He reported a case of a nurse being attacked with diphtheria, who kept quiet for several days before she admitted her condition, the result of which was that his

lying-in patient became affected with septicæmia and puerperal fever. The result of this mishap was followed with a second attack of fever with his next case.

He also stated a remarkable case where he had conveyed by accident (but not by neglect) erysipelas, and as an evidence of the truth of this fact his attention was directed to the enormous swelling of the vulva and the spreading of the disease upward over the abdomen, resulting in deep-seated abscesses, but happily the patient made a recovery. He has the habit of using liquor sodii chlorinatæ diluted in warm water that had been boiled, as a disinfectant, when there was any indication of the lochia becoming foul.

Dr. W. W. JAGGARD, Chicago, after expressing his belief in the Semmelweiss doctrine of puerperal fever and in the heterogenetic origin of the disease, wished to protest against the plan of preventive treatment suggested by Dr. More Madden, in the sentence "From the first day after delivery until convalescence has taken place the uterine cavity, as well as the vagina, should be daily washed out with water as hot as can be well tolerated." Such practice was in utter opposition to the views of antiseptic obstetricians. The conduct of labor and the lying-in period, with reference to the prevention of puerperal fever, by medical men whose opinions were entitled to the highest consideration, was, to-day, a very simple matter. The principles were: (1) to limit injuries of the genital tract as far as possible, and (2) to avoid infection of the inevitable lesions. The mammary glands are treated in accordance with the same principles.

The uterine cavity ought to be irrigated only when the indication is perfectly clear and distinct, *e. g.*, after the introduction of the hand, as in version. In the absence of a clear and distinct indication, as a routine procedure in all or any considerable proportion of cases, intra-uterine irrigation was purposeless, irrational and barbarous.

After disinfection of the cavum uteri by irrigation, in the limited number of cases in which it was indicated, permanent sterilization was effected by the introduction of a bacillus of iodoform, containing six to seven grammes—v. Mosetig-Moorhof's formula—and the application of a sterilized napkin over the vulvar orifice. Then the uterus and vagina ought to be *let severely alone.* It was very seldom necessary to repeat this process of permanent disinfection. There was no danger of toxæmia from the quantity of iodoform employed, since the rod melts rapidly and covers the genital tract, from fundus uteri to ostium vagina, with a thin lamella.

It was an axiom in obstetrical practice that a firmly contracted uterus was well-nigh proof against infection. During the first two days of the puerperium gentle friction over the fundus uteri, twice daily, aids materially in securing firm retraction of the uterine musculature, and does not at all interfere with the process of puerperal thrombosis. He believed this practice originated in Carl Braun's clinic, and thought it more efficient than the exhibition of ergot. Usually, however, there was no objection to the use of ergot in addition.

Dr. LLOYD ROBERTS—All of us who have heard the crisp and lucid remarks of Prof. Earle and Dr. Doléris must be quite satisfied that a great advance has been made in the treatment of puerperal fever. I quite agree with Dr. Earle, that the local treatment of the uterine wound by irrigation or curette, in those cases in which the cause of the trouble is due to rotted or rotting portions of placenta, membranes or blood clot, has been followed by excellent results. Dr. More Madden, in his paper, quotes the observation of Dr. Stokes, who said that he would as soon hope to cure a case of puerperal fever as he would a case of hydrophobia. I wish Dr.

Stokes had lived to see the good results following the general administration of germicides, such as quinine, etc., and the local treatment of the uterine wound by irrigation and the curette. No doubt the happy thought of Dr. James Y. Simpson, in comparing the uterine wound to the stump of an amputation, has helped us much in the needful treatment of cases of puerperal fever, or septicæmia.

Dr. Ira E. Oatman, Sacramento, Cal.—I concur heartily in the prophylactic traetment advised by Dr. Graily Hewitt. The essential internal treatment most successful with me has been anodynes sufficient to control the nervous and vascular tension, and liberal doses of the tincture of the chloride of iron, with four or five doses, in twenty-four hours, of quinine, in doses of four or five grains each.

Dr. James C. Cameron, Montreal—A satisfactory treatment for puerperal fever will never be reached till the profession learns to recognize that in the immense majority of cases puerperal fever is puerperal septicæmia. Dr. Robert Barnes, in a recent review of Parvin's "Midwifery," says that this view is narrow, because it does not take into account the peculiar condition of the puerperal woman's blood. He then reiterates his threefold theory of Endosepsis, Autosepsis and Exosepsis. Such teaching does great harm. Endosepsis is a myth, and if general practitioners are taught that puerperal fever can arise of itself, their practice can never be satisfactory. According to the germ theorists, septicæmia postulates the existence of two factors, the soil and the germ; hence, rational antiseptic treatment should run on two lines, the sterilizing of the soil, and the exclusion or destruction of the germs. The exclusion, after labor, of germs, is best obtained by the dry method of dressing; the insufflation of iodoform into the vaginal outlet and the constant closure of the vulva with a dry antiseptic pad sterilizes the air which enters the parturient canal. The pathologist sterilizes his culture tube, plugs it with cotton wool, and thus keeps his culture free from the contact of atmospheric putrefactive germs; so the obstetrician plugs his obstetrical culture tube and keeps it free from atmospheric contamination.

With regard to the use of the uterine douche and curette, I have obtained brilliant results in suitable cases, but I strongly emphasize the warning uttered by Dr. Jaggard, that great harm is done by continued and injudicious douching. The object of local treatment is to remove local sources of infection; when this has once been thoroughly done, a bacillus of iodoform introduced and the dry dressing applied, the parturient canal is practically aseptic, and only harm will result from further local treatment. When general systemic infection has occurred, a struggle between the white corpuscles and the microbes ensues; the issue depends upon the relative strength of the opposing forces, the army of the defenders and that of the invaders. The rational treatment of the general condition seems to be that applicable to all rapidly prostrating general diseases, such as diphtheria. Large quantities of nutriment and stimulants, with iron and quinine when required, will give more satisfactory results than any other. Success in the treatment of puerperal septicæmia will depend upon the skill of the physician in recognizing when to use local and when to use general treatment. The patient must be treated, and not the disease; there is no such thing as a specific treatment for puerperal septicæmia.

Dr. J. A. Doléris, Paris—I am happy to take part in the discussion of a subject which has always formed a part of my studies.

The subject has been discussed from the historical, theoretical and practical points of view.

Dr. Sibbet, in his historical account, has referred to the influence of the Vienna

school in the first attempts of modern obstetrical antisepsis. While Semmelweiss and his pupils directed attention to the dangers arising from the contact of hands, instruments and the like, with the genitalia of the parturient and puerperal woman, and obtained excellent results from antiseptic precautions, it must not be forgotten that the whole matter did not rest there. His practice was uniquely empirical, and certainly gained few converts. His hypothesis would have fallen had it not been replaced by precise facts, the notion of the material nature of the poison of puerperal septicæmia, the definite results obtained by experimentation. As a result of these latter factors, the doctrine holds an impregnable position.

French researches have come to take a legitimate place in the immense progress accomplished by the application of the germ theory to puerperal fever. I need only mention the name of Pasteur. The control, practiced in other lands, has done nothing more than to reaffirm our own beliefs. Semmelweiss has perhaps been the Lister of obstetrics, but his efforts would have remained impotent if others had not discovered the real foundation of the ideas which directed his practice.

Dr. Kucher has sought to maintain the importance of the doctrine of septic contagion through the genitalia. He is not disposed to accept other modes of the introduction of the poison into the economy of the puerpera, as through the lungs or the alimentary canal. There is a practical danger in accepting too readily the idea that the infection may occur through routes other than the genital canal, and independently of the practitioner. However, it is not possible to refuse to admit that there are cases of inevitable puerperal fever, less grave indeed than true septicæmia, but sufficiently well characterized to attract the attention, and that these febrile conditions—infections—have a cause other than the infection of the genital wounds. Puerperæ have no immunity, greater than other women, from atmospheric influences, conveyed through the alimentary canal, respiratory passages and the glands, and there is no reason for the rejection of the idea that a puerpera is infected through the same channels as any other woman. It becomes, then, a matter of difficulty to separate the two classes of cases. As a matter of principle, the accoucheur is not responsible for all the cases of puerperal fever of the former kind, although I repeat that in practice it is well and necessary that the generally accepted idea continue to be an absolute rule; for it is certainly better that one should not accept too readily the opinion that puerperal septicæmia is sometimes beyond the control and responsibility of the accoucheur.

Dr. Earle has spoken of intra-uterine curettement and irrigation in puerperal septicæmia. I am exactly of his opinion, and I become daily more convinced that the septic wounds of the uterus ought to be treated as septic wounds in general; that the douche is not sufficient, that there is no method more radical and more legitimate in the complete and rapid disinfection of the uterus than curettement, when symptoms of infection of the genital wound appear. Not only is the method rational, but it is devoid of danger. I have practiced the plan in thirty cases, up to date, and I have always obtained good results. Even in the cases on which I have operated as late as the fourteenth day, I have observed cures following the curage.

I uphold with all my power the idea that obstetrical antisepsis, to be absolutely efficacious, must be early and bold. It is not necessary that there should be retention of membranes or placenta within the uterine cavity, before resorting to curage. The indication exists when there are symptoms of positive septicæmia.

Dr. Geo. Wheeler Jones, Danville, Ill.—I arise to express my gratification at hearing Prof. Earle's paper, and to give it my unqualified endorsement, so far as that may go.

Some sixteen years ago I adopted the invariable rule of declining obstetric cases while I was treating erysipelas, gangrene or other possibly septic disorders. I have had my full share of parturient women to attend, but have never had a case of puerperal fever except as I took it from the hands of another physician, or had the woman poisoned by a careless nurse, when a speedy resort to measures similar to those proposed by Dr. Earle would bring prompt relief. Rapidly recalling to my mind the puerperal women who have died in my vicinity during the past two years, I count nine, one of whom died from post-partum hemorrhage, one from shock by injury in a craniotomy, and seven from septicæmia directly traceable to one of the attendants. Nor were these all, but they are all that I can recall definitely now. None of them were my own cases, I am happy to say. I never examine a puerperal woman without thoroughly cleansing and disinfecting my hands, and clothing if needed, for which purpose I use the bichloride solution, Listerine, or oil of turpentine, the latter of which is one of the very best for the worst cases. I do not believe I ever poisoned a patient. I object to the intimation of Dr. Sibbet, that the intra-uterine procedures necessary to obtain a perfect result cannot be carried out by the country accoucheur at the home of the patient. When such is the case the unfortunate practitioner had best retire from that branch, and let some more independent and active brother take his place. With a good modern syringe, one of the improved intra-uterine douches, with tube for return current, a long, pliable copper wire, readily bent to any form of loop or curve, and a good antiseptic, a few things which every physician should have in his obstetric case or gynæcological bag, or can promptly obtain at his office, he is ready for his work, and the first two or three operations, if needed, he ought to do himself, if more than one douche should prove necessary, after which a trained nurse or assistant can continue the care during his unavoidable absence. In one of the worst cases of which I took charge the past spring, I taught the husband of the lady, in two days and after the third cleansing, to carry out all the further procedure necessary, being applicable only to the vagina. I think if we will only simplify the whole proceeding, not only in our own minds but in the minds of our patients and friends, we will receive more cordial support and secure better results. After ourselves removing all offending matters from the uterine cavity, the case can be safely placed in the hands of such a nurse as every obstetrician ought to be able to train and command. Placing the patient across the bed upon a broad board covered with oilcloth, the head of the board slightly raised, and the cloth leading to a receptacle, with a couple of assistants and a cool head we have absolute control. Yes sir, Mr. Chairman! every doctor in America, worthy of the name, ought to be able unhesitatingly to carry out every provision demanded by the cases under consideration, the great principles of treating which are embodied in the apostle's injunction "Keep yourselves free from all uncleanness of the flesh," and "be diligent in your business." A specialist should never be required to take charge of cases that may be met with every week or month in the range of one's own country practice. The simplicity of puerperal antisepsis, and its effectiveness in the saving of life, makes it incumbent upon every physician to be able to fully carry it out at any time his services may be required.

Dr. DeLaskie Miller, Chicago, thought that the subject under discussion ranked in importance with the most dangerous complications which may be encountered in obstetrical practice. The causes and nature of the affection have been well summarized by Semmelweiss and Schroeder. Much has been said regarding the importance of cleanliness as a preventive measure, all of which he endorsed to the last degree.

As preventives of puerperal fever, there are factors which have not been enumerated in this discussion. They relate to the conduct of the second and third stages of labor. Among these he enumerated :—

1st. The proper mode of delivering the child. The inferior portion of the trunk, and especially the inferior extremities, are frequently, and he thought he might say generally, extracted too suddenly. Thus the early active interference by the accoucheur predisposes to imperfect and irregular contractions of the uterus, and may thus complicate the third stage of labor, whereas, if no assistance be offered, the uterus, stimulated by the presence of the inferior extremities of the child, will contract normally upon its contents until the child is entirely extruded. At the same time the placenta will be separated from the uterus, and will be expelled by the natural forces when the uterine contractions are resumed.

He does not hesitate to resort to Credé's method in case of delay, but he emphasized the assertion that all severe kneading of the uterus is injurious, for the uterine tissues in the conditions assumed would be contused by slight mechanical force.

After careful ablution of the external parts, the application of the dry aseptic pad completes the management of the labor. It is not difficult to understand what influence this conduct of a labor will exert in preventing puerperal septicæmia. 1st. It insures normal contraction and retraction of the uterus. 2d. There will be no open blood vessels or lymphatics to receive septic material. 3d. There will be no fragments of placenta retained in the uterus to putrefy and poison the blood, and, 4th. Normal involution should follow.

R. Lowry Sibbet, Carlisle, Pa.—I do not pretend to say how the sulphate of morphia becomes an antiseptic and preventive. I merely state what I believe to be true. I agree in general with the criticisms that have been made. I cannot, however, see the propriety of making use of the uterine douche; I maintain that it is an impracticable, and in many cases a useless, procedure. It is, at least, an indelicate procedure, and I could not recommend it except in very rare cases, such as in adherent placenta or rupture of the uterus. Secure firm contraction of the uterus and use internal antiseptics. It is proper always to require cleanliness on the part of patient and nurse; but septicæmia does not arise from common filth or dirt. In hospitals, of course, a foul atmosphere may carry the germs of fermentation to those susceptible to the disease. As Prof. Simpson said, there is a strong resemblance in puerperal fever to surgical fever. In the contraction of the womb, nature has provided for the gradual escape of the lochia.

# CONSERVATIVE OBSTETRICS, WITH SPECIAL REFERENCE TO THE REMOVAL OF THE SECUNDINES AFTER ABORTION, AND TO THE TREATMENT OF THE THIRD STAGE OF LABOR.

## OBSTÉTRIQUE CONSERVATRICE AVEC UN RAPPORT SPÉCIAL À L'ÉLIMINATION DES SECONDINES APRES AVORTEMENT, ET AU TRAITEMENT DU TROISIEME PÉRIODE D'ACCOUCHEMENT.

## CONSERVATIVE GEBURTSHÜLFE, MIT BESONDERER BEZIEHUNG AUF DIE ENTFERNUNG DER NACHGEBURT BEIM ABORTUS, UND AUF DIE BEHANDLUNG DER DRITTEN GEBURTSPERIODE.

BY PROFESSOR RODNEY GLISAN, M. D.,

Portland, Oregon.

According to the present status of the science and art of midwifery, it appears to the writer of this article that the golden mean in practice should be the aim of the ordinary practitioner. It is undeniable that even extreme methods of practice, in the hands of experienced specialists may, in general, yield good results. Hence, practitioners of extensive experience, whether they belong to the class who think that because labor is ordinarily a physiological process little or no aid is required from art, or to the class of heroic practitioners who must do something, even though they ignore nature altogether, may claim for their respective lines of practice a fair degree of success. The practice, however, of both these extreme classes cannot, in my humble opinion, compare favorably with that medium or judicious one which neither meddles with the proper physiological performance of a function, except to aid it, nor yet reposes a blind confidence in the powers of nature.

Assistance by art may sometimes be necessary in physiological midwifery, and is absolutely essential in pathological cases. If the heroic practice were strictly confined to adepts the general result might be passably good; but, unfortunately, the young and inexperienced in our profession are more apt to follow the teachings of those who advocate extremely active measures than of those whom an extensive experience has taught that, although nature may occasionally be assisted, she should but seldom be supplanted by art.

It is the object of this paper to briefly pass under review what the writer conceives to be a few of the sins of omission and commission in the practice of midwifery, so far as relates to the removal of the secundines after abortion, and to the treatment of the third stage of labor.

First, then, as to removal of the secundines after abortion. I might furnish statistics of a large number of cases seen by myself, in consultation and otherwise, during a practice of thirty-nine years, but deem a few examples sufficient to elucidate my remarks.

I was lately called in consultation with two physicians to see a woman who, in their opinion, was in a dying condition from hemorrhage. The family doctor stated that she had been summoned to the patient two days previously, and found that she had just aborted a four months fœtus. No effort had been made to remove the placenta, as nature was considered equal to the emergency. From that time until the consultation repeated hemorrhages had occurred, which she had endeavored to restrain by teaspoonful doses of Squibb's fluid extract of ergot several times daily, and by tamponing the vagina. At the expiration of forty-seven hours from the time of the expulsion of the fœtus the patient had an exceedingly profuse hemorrhage, and passed into a state of collapse.

A consulting physician was called in, but the patient seemed so nearly dead that additional advice was considered necessary, and I was summoned.

We created a slight reaction by hypodermic injections of brandy and sulphuric ether, and external applications of mustard, etc., and then extracted the placenta by the manual method of pressing down the womb with one hand placed upon the abdomen, and inserting the index finger of the other into its cavity, and gradually detaching and removing the offending mass. The flooding ceased, and the patient made a good convalescence.

A week subsequent to my visit to this patient I was summoned to the same neighborhood to see another lady who had aborted about the end of the third month of pregnancy. The medical attendant had made no effort to extract the retained secundines, and the woman continued to flood fearfully, at intervals, for several weeks. Finding the cervix uteri slightly patulous and dilatable, I delivered the placenta by the bimanual process. The hemorrhage ceased and she made a good recovery.

I have several times seen cases of retained secundines where the expectant practitioner has permitted his patient to suffer from hemorrhage for several months; thus not only endangering her life for this long period, but subjecting her to medical and incidental expenses truly burdensome, when a timely removal of the placenta would have restored her to health in a week.

I have seen many cases of septic infection from retained secundines, and a few of subinvolution, areolar hyperplasia, pelvic cellulitis and pelvic peritonitis, with occasionally a fatal result. On the other hand, I have never seen any fatal issues from a timely and judicious removal of the placenta by the manual method.

For dilatation of the cervix uteri, and removal of the secundines, I generally use only the index finger, or this and the middle finger.

I do not claim to be able to remove the secundines at the first trial in every case of abortion, but have always succeeded, if called within a few hours after the expulsion of the embryo or fœtus, while the cervix uteri was still dilated or dilatable.

I sometimes administer an anæsthetic, but just as often not at all. The cases usually requiring its use are those with rigid abdominal walls, where it is occasionally difficult or impossible to depress the uterus sufficiently for the insertion of one or two fingers into the uterine cavity without passing the hand so far as the thumb, or entirely, into the vagina. I sometimes administer an anæsthetic when, from excessive nervousness or sensibility, the woman becomes uncontrollable; and, occasionally, when the cervix uteri is very undilatable. I generally use either chloroform alone, or a combination of one part of alcohol, two parts of chloroform, and three of ether. In cases of anæmia from hemorrhage I employ only ether. In order to properly depress the womb it is necessary to place the woman in the dorsal position, with her thighs well flexed. If there be urine in the bladder it should be passed, or drawn by a catheter. One hand is then passed deeply into the abdomen, and the uterus pressed down within easy reach of the finger of the other hand. The index finger should then be slowly and carefully passed through the cervix into the cavity of the uterus, when, by prudent manipulation, the secundines can be extracted.

In order to pass the index finger into the uterine cavity it is occasionally necessary to introduce a part, or the whole of the hand into the vagina.

It is much better to bring the secundines away in one mass than by fragments, but it is often impossible to do so. The uterus must, however, be entirely emptied to secure the patient against hemorrhage and septicæmia. This can generally be effected by patience and properly directed manipulation.

If I be not summoned to the patient prior to the contraction of the cervix, and cannot accomplish the removal of the secundines by the manual method without injurious force to the patient, and the hemorrhage is not dangerous, or is controllable, I await a

more favorable opportunity; using in the meantime the tampon, ergot, astringent injections, etc., if hemorrhage renders such means necessary. In a day or so the cervix is very apt to relax sufficiently to permit the gradual passage of the index finger along the canal, when the secundines may generally be removed.

It occasionally happens that, although the secundines cannot be removed at the first attempt, they may be partially detached so as to allow a small portion to wedge itself through the internal os uteri. This serves as a gradual dilator, and at the next visit the physician may find his efforts more successful. Of course, delay is attended with danger from hemorrhage, septicæmia, etc., but the results are not ordinarily so bad as they would be from the employment of injurious force, either by the finger or artificial instruments.

Although I have always kept on hand the most approved instruments for the removal of the secundines after abortion, I have never been so successful with them as with nature's intelligent and trusty instrument—the finger.

To use the placental forceps without the guidance of the finger is to act rashly. When the finger can be inserted far enough into the uterine cavity to be a safe guide for the forceps it is capable of performing the act of removal better alone than by the help of the latter, or the curette, and more safely.

The finger is a most admirable dilator, and may, in cases of great and uncontrollable hemorrhage, when no delay in the removal of the secundines is allowable, be used as such, although the os uteri will not at first admit its tip. For, by gradual pressure in the right direction, after the uterus has been brought down by external pressure within easy reach, it can always be passed through the cervix uteri with less danger than would arise from the use of an artificial dilator. The greatest resistance to the passage of the finger into the cavity of the uterus is often found at the internal os uteri. This may be readily overcome by the inhalation of chloroform. The practice that I have thus outlined, though far removed from the expectant mode, is by no means so dangerous to the patient as the more heroic artificial instrumental method; and I have, therefore, termed it conservative. With unimportant exceptions, it is the method at present adopted by many of our most experienced obstetricians who seek the honor of being useful rather than the reputation of advanced physicians.

I shall next pass under review the three principal modes of practice adopted for the removal of the placenta in labor, viz.: the expectant, the Dublin Grip and the Credé methods; to which may be added a fourth—the conservative or modified Credé mode, which I prefer to either of the others.

I shall cite only one example out of the many sins of omission on the part of expectant obstetricians that I have witnessed during a long professional career. One, however, that confirmed my belief that if meddlesome midwifery is bad, the let alone method is still worse.

Shortly after graduating, in 1849, and while practicing medicine in Baltimore, Maryland, I received a hasty summons to a woman who was flooding fearfully from a retained placenta. After the birth of a child her medical attendant, who was an educated physician of experience, believing that the placenta would not soon be expelled, took his departure from the house under a promise of returning in a short time. After the lapse of several hours flooding commenced, and a messenger was dispatched for the doctor. Not finding him, my assistance was sought. I found the woman almost in a moribund condition. As the urgency for the removal of the placenta was great, and I could not effect it by pressure upon the uterus through the abdomen with one hand, and traction on the cord with the other, I grasped the fundus with my left hand, and introduced my right hand, with the fingers in the form of a cone, into the uterine cavity, and, after detaching the placenta, allowed both it and my hand to be expelled by the next uterine contraction. I then gave the patient a dose of ergot, and

left her in charge of her medical attendant, who arrived just as I was leaving the lying-in chamber. He told me afterward that she made a good recovery, and frankly added that he would never again blindly trust to nature alone. I have no doubt that if the first pains after the expulsion of the child had been assisted by abdominal pressure on the womb and moderate traction of the cord, the woman could have been delivered of the placenta in fifteen minutes after the birth of the infant.

Had this case, and numerous others of a similar character with which I have met, been in a hospital under the constant watch of competent assistants, there could have been but little danger, even though under the treatment of armed expectancy; but it is quite otherwise in private practice. For here it is impossible, even though it were in other respects advisable, for the physician always, or even generally, to remain by the bedside of his patient until nature alone concludes the third stage of labor. For although the placenta is generally expelled in twenty-five minutes into the vagina, and from the latter within three hours after the birth of the child, it may remain in the uterus many hours, and in the vagina for a month or more. See footnote to page 364, *American Journal of Obstetrics*, for April, 1885.

There are few physicians who would endure this monoply of their time, and not many patients, comparatively speaking, who could afford to compensate the doctor for his services; and still fewer who would submit to the anxiety of mind attendant upon the knowledge that they must wait an indefinite and possibly lengthy period for nature to effect what their physician was employed to do in a shorter and safer way.

The experience of the majority of physicians of large practice proves that a retained placenta forbodes more evil of hemorrhage, septicæmia and chronic pathological conditions of the uterus, than a timely and judicious removal of the same.

Unfortunately, the pendulum of professional opinion in obstetric practice will swing from one extreme to another. Without going back to ancient times, it may be stated that the bad results accruing from the violent means used for the immediate removal of the placenta in vogue prior to the time of Smellie, Denman and Hunter, induced them to advocate a purely expectant treatment; but the great Hunter finally settled upon a medium method of treating the third stage of labor. The expectant plan, however, soon became the fashion, but proved so unsuccessful that a reaction took place in favor of a more energetic mode of treatment, called the Dublin grip, which is variously defined by different authors, but consists, essentially, in laying one hand on the abdomen during the latter part of the second stage of labor, and following the womb down with moderate compression until the birth of the child, when greater pressure is used in order to expel the placenta, without waiting for a natural uterine contraction.

The Dublin grip has, within the last few years, been almost superseded by the Credé method, which differs from the former in using very little abdominal pressure until the acme of a natural uterine contraction for the expulsion of the placenta, when the fundus is grasped with one hand, and downward pressure made in the axis of the womb. The pressure being repeated at the height of every pain until the delivery of the placenta.

During the last few years a reaction from the Credé method has sprung up in Germany, the home of Credéism itself, and bids fair to engulf us in the old doctrine of expectancy, unless conservative obstetricians protest against such vacillations between dangerous extremes.

I am aware of the little influence that I can yield in this direction, but after much experience shall state that every year's practice confirms my long established belief that conservative midwifery is safer and better than either of the extreme methods.

As, however, conservatism is defined somewhat differently by different persons, it

may be proper to state in a general way my application of it in the treatment of the third stage of labor.

I would not trust blindly to nature and remain in a state of expectancy, nor even armed expectancy, nor would I, on the other hand, go to the opposite extreme of over-active Credéism, and supplant her almost entirely. Yet, if my choice had to be one of the two extreme methods, I should, in private practice, prefer that of Credé. My objections, however, to the latter are chiefly two: the use of too much abdominal pressure in the expulsion of the placenta, and the non-employment of traction on the umbilical cord.

It has been my experience that by the combined and judicious action of both abdominal pressure of the uterus and traction of the cord the completion of the third stage of labor may be accomplished with much less pain and risk to the mother than by the use of either means separately.

My practice is, so soon as the second stage of labor has been completed, to lay one hand on the abdomen and lightly grasp the fundus and so much of the body of the womb as possible, and if there be no urgency, such as flooding, for immediate delivery, I await the natural contractions of this organ. If they be too tardy I stimulate them into action by gentle frictions and squeezings of the womb.

At the acme of the first uterine pain I squeeze the superior portion of the womb and at the same time press the fundus downward in the axis of the womb, or of the brim of the pelvis toward a point between the hollow of the sacrum and the apex of the coccyx. While making this compression with one hand, moderate traction is made on the cord with the other, care being taken to seize the cord as close to its insertion in the placenta as possible. This process is repeated at the height of every contraction of the womb until the delivery of the placenta, which generally occurs during the third or fourth pain, or within twenty-five minutes after the birth of the child, without the employment of injurious force.

When the placenta has passed through, or nearly through the vulva, it is rotated several times so as to twist the membranes, which are then slowly and carefully withdrawn. If uterine contractions serve only to hold the membranes the tighter instead of expelling them, it is better to await their relaxation, and then gently to withdraw the membranes.

The chief differences between this combined method of placenta delivery and the Dublin grip consists in exercising very little pressure except during the acme of the natural uterine contractions; and from the Credé method in not using so much force in expression, and in aiding the abdominal pressure by moderate traction on the umbilical cord—an important assistance, yet deprecated by Credé and his followers, as well as by many of the advocates of the Dublin grip.

Strong traction on the cord, as taught in most text-books a few years ago, and generally practiced at that time, is unnecessary, and even injurious. But traction applied moderately at the proper time, and in the proper manner, in conjunction with judicious pressure, serves a most excellent purpose. Inversion of the womb, sometimes caused by powerful traction on the cord when the former is relaxed, cannot occur from moderate traction when the uterus is contracted and properly grasped within the hand during downward pressure.

We ought not to abandon so useful an adjunct as traction because of its former abuse, nor on account of the fashionable statement, advanced by Spiegelberg and Duncan, that traction on the cord interferes with the natural expulsion of the placenta, which, according to their assertion, will, if let alone, usually appear at the vulva with its edge foremost, instead of with the fœtal surface, as is generally the case after traction. If Spiegelberg and Duncan be correct the observations lately made by the expectants in several German Hospitals, especially in Giessen and Strasburg, are erroneous. For

they tend to the belief that when let alone, the placenta is, with few exceptions, expelled with the fœtal surface in advance.

In a hundred cases at Strasburg, treated upon the pure expectant plan, or absolute abstention from any kind of interference, the fœtal surface of the placenta appeared first in the os and in the vulva.

No matter which party is correct about the part first expelled, moderate traction on the cord can, when timely and judiciously made, do no harm, but on the contrary does much good by assisting external pressure.

I have never found it necessary to wait more than half an hour for the delivery of the placenta and membranes by the conservative combined method of treatment, the average time being about twenty minutes. If dangerous hemorrhage occur in the meantime, which is a rare accident, I use more force, both in pressure and traction, than usual. If not immediately successful I insert my hand, with the fingers placed in the form of a cone, into the cavity of the womb, while supporting the fundus with the other hand, and deliver the placenta ; as was done in the instance I have related.

In conclusion I beg leave to briefly summarize the practical points advanced in this paper.

1st. It is here contended that, so far as relates to the removal of the secundines after abortion, they ought, when possible without injurious force to the patient, to be removed immediately after the expulsion of the embryo, prior to the contraction of the cervix uteri, by the bimanual method of abdominal depression of the uterus with one hand to within easy reach of the index finger of the other, and of inserting the finger far enough into the cavity of the womb to seize the secundines and remove them.

2d. That although the most favorable time for their removal is during the period of dilatation or easy dilatability of the cervix, within an hour or two after the expulsion of the embryo, yet when professional aid cannot be obtained until the expiration of this time their removal may often be effected without much difficulty or danger at a later period, but should be at any time if dangerous accidents, like hemorrhage or septicæmia, occur. In cases where their removal is extremely difficult, and excessive hemorrhage or septicæmia does not demand an immediate emptying of the womb, the tampon and ergot may often be used to great advantage in checking moderate hemorrhage until a more favorable condition for removal occurs.

3d. That in the practice of ordinary obstetricians the finger is preferable as a dilator and extractor to any artificial instrument.

4th. That the heroic method of immediate removal of the secundines by artificial instruments after expulsion of the embryo, without reference to the condition of the cervix uteri, or the presence of dangerous accidents, such as hemorrhage, should be deprecated.

5th. That while in hospitals, where there is constant supervision on the part of trained obstetricians, the expectant treatment for retained secundines after abortion, and for the third stage of labor, may be tolerated, though not commended; it should be avoided as impracticable and highly dangerous in domiciliary practice, especially where the physician resides at a distance from his patient.

6th. That the opposite extreme, in the treatment of the third stage of labor, of forced expulsion by pressure alone of the uterus, called Credé's method, though preferable to expectancy both in private and hospital practice, is too heroic, and ought to be superseded by the conservative method of moderate external pressure, chiefly during a pain, upon the superior portion of the uterus, in conjunction with judicious traction on the umbilical cord.

DISCUSSION.

Dr. GRAILY HEWITT, London, Eng., would endorse most fully the points brought out in the paper just read by Prof. Glisan. As regards the treatment of abortion, he believed that it was most important to remove the secundines, but he had observed that early in the abortion the internal os was often very narrow. In such cases a little time should be allowed before attempting manual extraction. For removal, the finger was best, coupled with depression of the uterus from the outside.

Dr. J. L. COOK, Washington, D. C., said: I feel it a duty to protest both against the term "moderate traction on the cord," and the method suggested by it. The term is a dangerous one, because of the indefinite idea of force which it suggests. Its liability, therefore, to varied interpretation, makes it at least an undesirable one to present to young men about to conduct their first obstetric cases. It is especially dangerous, however, as a suggestion to untaught, and, if you will pardon the expression, I might say "unteachable," midwives, who, in their own conceit, know infinitely more of such things than any young graduate of the schools, and who obtain their cues in practice from observing the older practitioners at the bedside, and from the method of the older obstetricians as related to them by patients.

Now, as to the practice itself. In 297 cases of natural labor, of which I have notes, I have never found it necessary to influence the termination of the third stage by "moderate traction on the cord." Every one of these cases has gone on to completion by spontaneous expulsion of the secundines, or assisted only by guarding the contracted uterus at and after the close of the second stage, by grasping the fundus gently in the hand, and by twisting the membranes into a rope after the placental portion has been thrown into or out of the vagina by the very adequate efforts of nature. In cases of partial uterine inertia, or when the uterus is apparently resting after protracted labor, Credé's method, and a little patient waiting and watching, have been found to serve their purpose effectually and with the least possible danger.

Of twenty-nine cases to which I have been called by midwives after the birth of the child, twelve have been for hemorrhage after "moderate traction on the cord," or their interpretation of the term; sixteen for fever set up by absorption of the products of decomposing placental tissue or membranes left *in utero* after such method of practice; and one for complete inversion, due to the same cause. When, therefore, we consider the danger from primary and secondary hemorrhage, partial or complete (and in many cases unrecognized) inversion, and infection due to decomposition of placental tissue retained, all caused by the varied interpretations of this term "moderate traction," we are forced to conclude that the term itself is an unfortunate one, and the method dangerous and unnecessary.

# INTERNAL UTERINE HEMORRHAGE.

## HÉMORRHAGIE INTRA-UTÉRINE.

## INNERE GEBÄRMUTTERBLUTUNG.

BY EDWARD HY. TRENHOLME, M. D.,

Of Montreal.

Over-distention of the uterus, from excessive secretion of the liquor amnii, is not generally regarded as a serious affection, and has not received much attention at the hands of our authorities on midwifery.

The effect of over-distention upon the general health has long been recognized, but that it may be the cause of serious and even fatal intra-uterine hemorrhage during gestation has not been noticed, so far as I know. This excessive secretion is usually met with in those who have borne many children, or where the general health is much enfeebled. It is in similar cases of ill health or multiple gestation that we meet with the opposite state, or deficient secretion of amniotic fluid, cases in which the whole fluid does not amount to more than a couple of ounces. It is in these latter cases that we meet with non-union of the reflected and uterine deciduæ, which permits of uterine hemorrhage (without abortion) during pregnancy, as pointed out in a short paper which I had the honor to read before the Obstetrical Section at the International Centennial Medical Congress in 1876. In these cases the apparent cause for the lack of fluid would seem to lie in the deficient functional activity of the glands of the decidua, and the resultant hemorrhage accounted for by a possible menstruation on one side, or from friction, on the principle of the ovum acting as a foreign body in the uterus. The hemorrhage has a free outlet between the ununited deciduæ, and hence the frequent attacks of metrorrhagia, or even menorrhagia during such gestations. In the present paper the case is quite different—here we may have extensive, or even fatal hemorrhage from over-distention; a hemorrhage, too, that cannot make itself apparent, and must be diagnosed only by the effects upon the circulation and shock to the system. This diagnosis is difficult to make, as we have the complicating factor of the general enfeebled state of the patient to take into consideration, such patients continually suffering and thus unable to lie down for weeks, and, therefore, it is apt to be overlooked. The cause or causes of hyper-secretion of this fluid must necessarily be obscure, and each person may have his own views, but I have noticed that the onset of the disease has been often preceded by nervous shock or mental distress. Whether the changes begin in the blood or in the secreting surfaces I would not venture to decide, but my own view favors the former. Any way, what I want to bring before you is not the causation of the excessive fluid, but the evil results this excessive fluid may cause, and how these serious results are brought about. To understand what I say it is necessary to bear in mind some points connected with the anatomy of the uterus. It is well known that the muscular structure of that organ is the most feeble at the cornua. I need do no more than refer to this fact, which may be borne in mind when we meet with a case calling for surgical interference. Now, what shall we find in such a case as I refer to? The patient, already greatly distended and miserable, has an attack of severe pain in one or both hypochondriac regions, with a sense of fullness and increased weight at the part, shortness of breath, cold, clammy skin, flattening of the surface, feeble, rapid pulse, a sense of impending dissolution—in short, well-marked symptoms of shock, from which it is difficult to arouse the woman. While these conditions obtain, we can do nothing except relieve pain and stimulate the patient. Now, what has occurred to cause this dangerous crisis? Has there been an escape of the uterine con-

tents into the peritoneal cavity? If so, the character of the suffering and the contour of the abdomen would be different. Here there is no flattening, but rather increased tension and fullness of the central mass. Hence we exclude escape of fluid into the cavity of the abdomen. Well, what has taken place? Just this; the over-distended uterus has caused the ill-developed decidua of the region of the cornuæ to give way, and the rupture of blood vessels sufficient to induce the above-mentioned train of symptoms. It is not difficult to understand the mechanism of this hemorrhage. The muscular tissue of the multipara is naturally flaccid and atonic, while the decidua is not so distensible as normal, and hence must rupture where the muscular distention exceeds its own limit of coördinate action. The effusion of blood coagulates when poured out, and forms clots varying in weight and consistency according to the quantity effused and the time which it is retained. I have met with well-organized fibrinous masses, placenta-shaped, from 1¼ to 1½ pounds weight. It is seldom, however, that a very long period elapses between the hemorrhage and premature labor. These clots descend between the uterine walls and decidua of the ovum, and pass out over the external surface of the decidua before the placenta comes away. There is no trouble in recognizing such masses. The friability and color of the mass, with the absence of cord and membranes, prevent the possibility of any mistake. It is in these cases we must not overlook the possibility of such a mass being retained after the removal of the entire secundines. Such an oversight might be followed by serious results which I need not mention. The after results of such complications must not be overlooked. Such patients are apt to have subsequent inertia of the uterus and a liability to hemorrhages for many months afterward. The impoverished state of the blood tends toward a slow convalescence and delayed return to health.

In conclusion I would say a word as to treatment:—

1. Hydrops amnii calls for puncture of the decidua and induction of premature labor as early as is consistent with the viability of the child. In Canada, the religious prejudices of a large class of our people prevent a resort to this treatment, but still it is our duty to point out the dangers of over-distention, and urge its rational treatment.

2. It is too late to puncture the membranes when the hemorrhage is going on, as it would leave the vessels free from pressure and be apt to be followed by fatal hemorrhage.

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## MATERNAL IMPRESSIONS AFFECTING THE FŒTUS.

### IMPRESSIONS MATERNELLES AFFECTANT LE FŒTUS.

### MÜTTERLICHE, AUF DEN FÖTUS WIRKENDE EINDRÜCKE.

BY WILLIAM T. TAYLOR, M. D.,*

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This subject has occupied my attention for several years, but in this age of microscopical discovery and scientific research, when our thoughts, expressions and actions must be examined with mathematical precision, to present any paper for investigation which cannot be so explained will subject its author to the reputation of being "behind

* Posthumous paper.

the times," and the subject as unworthy of consideration. Yet, as it is a "mooted question" it may have some claims for presentation to this learned representative body of medical men, which is meeting in our Capital city from all parts of the world.

There are many things which are incomprehensible to us, not being governed by any known laws; yet we cannot reject them as unworthy of belief. We cannot explain the mysterious union between mind and matter: why, in a state of hypnotism, one person can be controlled entirely by another, as a mere machine. Do we know how the somnambulist can walk safely over dangerous places, when the external senses appear to be asleep? How did the stupid negro "Blind Tom," without any previous musical training, perform so wonderfully on the piano as to astonish the most skilled and scientific performers? Why do some cases of insanity become so aggravated every month, during certain phases of the moon, as to require restraint for the time?

We cannot explain how the principle of life can be kept in the Dervish or Fakir, who for several weeks has been voluntarily placed in a vault, excluded from air, light, water and food, and from this suspended animation has again been restored by his associates to his normal condition. So many cases have been attested of this remarkable condition of simulated death, that its facts are practically beyond dispute.

In view of such things we can believe with Hamlet that "there are more things in heaven and earth than are dreamt of in our philosophy."

We know that the form and features, the nervous and mental attributes of its parents, may be impressed upon the child, often so indelibly that whole families will exhibit some peculiarity of their ancestors; and why, then, should not defects and abnormal conditions also occur, if from any cause the fœtus is arrested in its developing stage, when the organs or structural parts are in a plastic condition.

The nævi and "wine-colored" spots seen on many persons must have occurred during fœtal life, by some disturbing element interfering with the normal process of growth and causing this congestion of the capillary circulation which remains indelibly fixed in the derma or true skin.

Sudden fear has turned the hair white; and a shock to the brain or nerve centres has caused paralysis, or atrophy of a limb, preventing its nutrition and growth.

If a shock or violent disturbance of the mother's physical, mental or nervous system will arrest the development, and often kill the fœtus, causing an abortion, why, if not sufficient to destroy the product of conception, might it not so interfere with its growth as to cause some abnormality. So intimate is the connection between the fœtus and its mother, that some women will abort from very slight causes, as a long walk, a trip on the carpet, a stump of the toe, or even an unpleasant odor.

Dr. A. Combe says: "We have demonstrative evidence that a fit of passion in a nurse vitiates the quality of the milk to such a degree as to cause colic and indigestion (or even death) in the suckling infant. If in the child already born, and in so far independent of its parent, the relation between the two is thus strong, is it unreasonable to suppose that it should be yet stronger when the infant lies in its mother's womb, is nourished indirectly by its mother's blood, and is to all intents and purposes a part of her own body?

If a sudden and powerful emotion of her mind exerts such an influence upon her stomach as to excite immediate vomiting, and upon her heart as almost to arrest its motion, and induce fainting, can we believe that it will have no effect on her womb, and the fragile being contained within it? Facts and reason then, alike, demonstrate the reality of the influence, and much practical advantage would result to both parent and child were the condition and extent of its operations better understood."

Dr. Carpenter, in his "Physiology", says: "There appear to be a sufficient number of facts on record to prove that *habitual* mental conditions on the part of the mother *may*

have influence enough, at an early period of gestation, to produce evident bodily deformity or peculiar tendencies of the mind in the child."

Although this subject is ignored by scientists and many physicians as being unworthy of belief, yet every obstetrician of long practice has met with some abnormal condition or "mother's mark" on a new-born child which could not be explained by any natural law of development, but which the mother would attribute to some shock, fright or mental worry which she had received during her pregnancy; so that he was obliged to give some credence to her explanation of the cause, however unnatural it might appear. Of many such cases no record has been kept.

That this belief has taken a firm hold on the female mind is very evident, for one of the first questions which the mother asks when she has passed through the pangs of childbirth is, "Doctor, is my babe perfect?" Why this inquiry? It shows the apprehension of pregnant women, that something might have occurred during their gestation to interfere with the normal development of their offspring, and cause some deformity or defect in its structure.

Many mothers are apprehensive during their pregnancy of some injury befalling their child, because they have been exposed to horrid and revolting sights, and yet no effect was produced on their fœtus; but all are not equally susceptible to such influences, and, therefore, this proves nothing in the special cases which cannot be explained.

The objection to this view is urged "that the cord contains no nerves, lymphatics, capillaries or vasa vasorum," and, therefore, there can be no connection between the mother and fœtus; for the uterus is merely a nest or nidus in which it is protected until it is sufficiently developed to maintain a separate existence in a new sphere. It is generally believed that these abnormal conditions occur during the first three months of pregnancy, when the spinal column is yet undeveloped, or is in the formative stage, when a severe shock to the nervous system might be impressed on the growing fœtus.

From the earliest ages this subject has attracted the attention of mankind, and has always been an object of wonder and inquiry. The first instance on record is in Genesis, chapter xxx, where Jacob is said to have used this knowledge to obtain for himself some of the sheep of Laban.

In the sixteenth century, Ambrose Paré wrote a paper on "Monsters which take their Cause and Shape from the Imagination," showing that the subject attracted the attention of distinguished men at that time.

Eucharius Rhodion, about 1520, and J. Rueff, soon after, wrote treatises on midwifery in which they referred to the imagination of the mother as causing monsters.

Quaint Dr. Burton, in the "Anatomy of Melancholy," says in regard to pregnant women: "If she is over-dull, heavy, angry, peevish, discontented and melancholy, not only at the time of conception, but even all the while she carries the child in her womb, her son will be so likewise affected and worse; as if she grieve overmuch, be disquieted, or by any casualty be affrighted and terrified by some fearful object, heard or seen, she endangers her child and spoils the temperature of it; for the strange imagination of a woman works effectually upon her infant, that, as Baptista Porta proves, she leaves a mark upon it." He also says, "Great-bellied women should avoid all horrible objects and filthy spectacles, so as not to imprint on her child what she perceives."

In the 17th century, Philippe Peu, who wrote considerably on obstetrics, relates a case of a woman who, while pregnant, was attending to her devotions at a shrine of the Virgin Mary in the Hotel Dieu; she became so alarmed at a representation of the devil, that when her child was born it resembled that old fiend. An essay on "The strength of the Imagination in Pregnant Women" was published by Dr. Blundell, a member of the College of Physicians, London, in 1727.

During the present century several writers have considered this subject of maternal

impressions as worthy of some attention, and numerous facts have been recorded of their effects on the fœtus, which cannot be doubted.

Dr. E. Seguin says that mental traits and unnatural nervous conditions are often produced in children and individuals by some shock which the mother received during her pregnancy; and in a paper published in 1876 he gives several instances on reliable authority to prove the same and corroborate his views.

Dr. Isaac Ray, in a review of D. H. Tuke on the "Influence of the Mind upon the Body," when speaking on this subject, says: "The idea that such changes in the fœtus ever arise from maternal impression, in spite of pretty strong evidence in favor of it, is not generally regarded as proved. And yet the arguments chiefly relied on by the disbelievers involve a fallacy too apparent, one would suppose, to escape the slightest scrutiny. One man makes inquiry of 1200, and another of 2000 parturient women, respecting their apprehensions of malformation in the coming offspring, and failed to find them confirmed in a single instance. If such malformations and blemishes were far more frequent than they really are, such statistics would prove the lack of any connection between them and maternal emotions, but inasmuch as they seldom happen, being very rare departures from the normal type, such a relation cannot be disproved by negative evidence, which for this purpose would be outweighed by a single positive well-authenticated case. We might as well doubt the truth of half the facts in Tuke's volume, because many a physician of wide experience has never witnessed a single similar fact. No one would deny, we suppose, that the hair has sometimes been completely blanched by excessive fright or grief, simply because among the multitudes of cases of fright or grief that have come under his observation not one was followed by this result. The proper question is whether there are not enough well-authenticated cases of this relation between the parent and the fœtus to preclude the idea of their being dependent on other causes. Physicians should bear in mind that the impressions which pregnant women speak of are generally notions engendered in their own roving imagination, very different from those intense emotions which occasionally give rise to the effects in question."

Dr. Robert P. Harris says: "Although the fœtus in utero has no direct nerve connections with the mother, experience teaches us that mental impressions, especially those produced by anxiety and fear, have a marked influence upon the uterus and its contents. Many sensitive women have been made to abort by causes of a very trifling nature, producing sudden shock. Passion, we know, is capable of rendering the milk of a woman poisonous to her infant, so as to cause convulsions and death; then why may not the blood from which the fœtus in utero derives its nutrition be so changed by the shock or fright as to be capable of deranging the cerebral development of the said fœtus, as we know the same impression is capable of doing directly in a young child? There are points of very mysterious interest connected with the whole subject of intra-uterine development which can never be solved."

Dr. Wm. Goodell says "that there is more truth in this popular belief than physicians have been willing to concede." He has noticed, however, of late, a growing disposition on the part of scientists to treat the subject with more consideration. As a matter of fact, the spermatozoön, a microscopic cell, is capable of transmitting and reproducing paternal traits, both mental and physical. Hence, it would seem highly probable that the mother, who contributes so much to the structure of the new being, would be more likely to impress upon it her dominant traits during its plastic stage, and that unusual excitement or agitation on her part during this period would be exceedingly liable to disturb the development of the fœtus. He reported the following case: He was called to attend a lady whose husband, a physician, was possessed with the idea that the child would be born with some deformity of the genital organs. This, indeed, Dr. Goodell found to be the case, for at the birth the foreskin was

entirely wanting, and the glans encircled by a ring of granulations, presenting the appearance of a recent circumcision. This occurrence was attributed to the fact that the mother, during early pregnancy, had taken extraordinary interest in a description of this Hebrew rite, which her husband had been invited to witness in a neighbor's child.

Among the Jews, children are not infrequently born circumcised; and this curious fact is not to be explained by the law of heredity alone.

A somewhat similar case occurred to me recently. Mrs. G., an Irish woman of nervous temperament, gave birth to a boy whose glans was devoid of a prepuce, as if it had been circumcised, which she accounted for by telling me that during the early part of her pregnancy she had seen a little girl of five years, while sitting on a door-step opposite to her dwelling, pulling violently at the penis of a baby brother. Fearing that he would be seriously injured, she turned away from the sight, feeling quite sick at the time, little expecting then that she would mark her unborn babe; but now she was satisfied that that was the cause of this deformity.

A patient of mine was affected with valvular disease of the heart and dropsy. During her illness she was carefully nursed and constantly watched by her pregnant sister, who was much distressed by the suffering of the invalid. When the child was born it was smaller and more feeble than her other children, had a slow circulation, oppressed breathing, and could scarcely cry. It also had frequent attacks of dyspnœa, approaching to asphyxia, with blueness of the skin, indicating some abnormal condition of the heart or blood vessels. It died in a few months, but a post-mortem was refused. Her other children were perfectly healthy—those born before and those after the one referred to.

A Mrs. McV. gave birth to a female child, upon whose brow was a nævus, which projected out between the eyes to the size of a cherry and assumed a purplish hue whenever the child cried. I inquired if she had been frightened, or received any shock, in the early part of her pregnancy. She informed me that her mother, who resided in New York, had a cancerous tumor on her brow, between her eyes, which was being treated by the late Dr. Willard Parker. During early pregnancy she had visited her mother, and was often looking at this tumor with painful anxiety, and was "much worried about it." This certainly had some effect on her unborn babe, or why should this nævus be located there?

A medical friend told me that he had attended a young woman with her first child, a few years since. Immediately after its birth she asked him if the child's tongue was all right. "Why do you ask such a question?" She replied: "I thought there would be something on its tongue, for I felt quite annoyed at a friend of mine, soon after I was married, who, while eating some candy pellets, thrust out her tongue toward me, with one of them on the tip, saying, 'Don't you want one?' I turned away with disgust, but often thought of it." On looking at the babe's tongue, sure enough, there was a small cyst on the tip, about the size of a pea, which the doctor removed a few weeks after.

Dr. Arthur Mitchell, Commissioner of Lunacy for Scotland, has a paper in the *Transactions* of the Obstetrical Society of London, for 1884, on "Strong Mental Emotions affecting Pregnant Women as a Cause of Idiocy in the Offspring," in which several cases are cited where idiocy followed a fright received by the mother when pregnant. He says: "I have convinced myself that cases do occur in which this accounts for the defect of the offspring; and I see no reason why it should not be regarded as sufficient. That which seriously disturbs the mother's health, which deprives her of sleep, takes away her appetite, interferes with the assimilation of her food, makes the secretions abnormal, and leads to emaciation, can scarcely do this and leave the progress of growth and development in the fœtus to be pursued in a vigorous,

normal way. It has often been asserted to me with reference to an idiotic child under examination, that in the fœtal state it had received a "shock" at a time when sudden terror or grief had perturbed its mother, and as a proof of this it was sometimes added that at the time of the mother's alarm, or distress, the motion of the child became excessive, rapid, abrupt and jerky, giving the mother pain; and that this excessive motion soon subsided, no motion being felt for days afterward. In considering the account given of such cases, it has appeared to me that the movements described were probably convulsive in their character, and if so, it can scarcely be doubted that such disturbances as would produce convulsions might inflict serious and irreparable injury on the delicate nervous system of the fœtus.

The following cases are mentioned, which appeared to be caused only by violent mental shocks.

A fisherman's wife, while pregnant, saw her husband drowning in a storm, and became so alarmed that she fainted, and for a long time after was in feeble health. When her babe was born it was weak and idiotic.

Another pregnant woman lost three children by an epidemic in a very short time, which caused so much grief that she became sick for several months, and remained in her room until her child was born, which proved to be idiotic.

A woman, while pregnant, saw a child gored to death by an enraged cow, which so terrified her that she felt a violent shock, and such excessive movements in her womb that she feared she would abort. These, however, subsided, and when she gave birth to her babe it was idiotic.

A recent writer, Dr. Roswell Park, in opposing this "popular fallacy," admits that "it is impossible to explain the malformations that occur." He also says: "Except the single instance mentioned in Genesis, which must be discarded, I have never heard, nor have I been able to find any account, of an instance of the kind among animals."

Although no one can determine what the deformity of the fœtus will be in any given case, yet that mental impressions have affected animals has been proved by Lord Morton's mare, which was covered by a Quagga (an African wild ass) in 1815, and gave birth to a hybrid, which greatly resembled the ass. In 1817, 1818 and 1821, when she was served by a black Arabian stallion, all her foals bore strong marks of her first love.

Dr. Dunglison, in his "Physiology," has recorded the following case: When Dr. Hugh Smith, of England, was traveling in the country, the dogs ran out and barked as he passed through a village, and among these was a little ugly cur, "that was particularly eager to ingratiate himself with a setter bitch that accompanied him." While stopping to water his horse he remarked how amorous the cur continued, and how courteous the setter continued to her admirer. Provoked at the sight, he shot the cur and carried the bitch on horseback for several miles. From that day, however, she lost her appetite, ate little or nothing, had no inclination to go abroad with her master, or to attend to his call, but seemed to pine like a creature in love, and express sensible concern for the loss of her gallant. Partridge came, but Dido had no nose. Some time after she was put to a setter of great excellence, which had with difficulty been procured for that purpose, yet not a puppy did Dido bring forth which was not the picture and color of the cur that the doctor had many months before destroyed; and in many subsequent litters Dido never produced a whelp that was not exactly similar to the unfortunate cur already mentioned.

At the meeting of the American Gynæcological Association, held in Baltimore last year (1886), the subject of "Maternal Impressions" attracted some attention, for a paper was read by Dr. Fordyce Barker, in which several instances were related, showing the effect of emotions upon the development of the fœtus, and a committee was appointed to investigate the matter and report at a subsequent meeting; so that this

subject is again brought to the attention of obstetricians and physicians, and in time some truths may be elicited and a satisfactory explanation given of this "popular fallacy," as it is often called.

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## A STUDY OF DEVENTER'S METHOD OF DELIVERING THE AFTER-COMING HEAD.

### UNE ÉTUDE DE LA MÉTHODE DE DEVENTER POUR DELIVER LA TÊTE APRES VENUE.

### EINE STUDIE DER DEVENTER'SCHEN METHODE ZUR ENTWICKELUNG DES NACHFOLGENDEN KOPFES

BY JOHN BARTLETT, M. D.,

Of Chicago, Ill.

Of all obstetrical authors whose writings I have consulted, no one speaks of the operation of turning with such confidence of a successful result, as regards both mother and child, as Henry Deventer. In his work on midwifery are several passages commenting on the ease and safety of the operation, and indicating his mode of procedure, and the successful results of his practice. Some of these I here quote: "I think it is to be noted that most are too afraid of the infants coming with their feet first into the passage. Wherefore, the ancients teach that an infant coming with its feet first is to be turned, and that its head is first to be directed into the passage, which work would be either impossible or useless; for the delivery of an infant coming with its feet first is sometimes as successful, nay, sooner succeeds than when it comes with the head foremost; and to speak freely, there seems less danger in that; so that I dare affirm that pelvic extremity births are attended often with less danger, and though I am the first, perhaps, that dares to write so, yet I cannot forbear discovering my opinion. I can affirm that I never perceived so much danger and pains in the exclusion of an infant coming with its feet foremost as in those that offer the head."

"If it be asked, Is turning dangerous? I answer, By no means; there is not one-tenth part of the danger if the infant be turned and drawn by the feet as there is if cephalic version be performed, whatever way the infant offers itself, provided that the birth be seasonably and cautiously performed by version."

"By turning neither the mother nor the infant are in danger of their lives."

In no way can the position of Deventer in relation to turning be so forcibly set forth as by contrasting his utterances in reference to it with opinions expressed by some of the ablest of modern writers. Says Dr. Meigs: "The act of turning to deliver by the feet is fraught with danger to the mother." Deventer writes: "What, I pray, should there be mortal in turning?"

On account of danger to the child, obstetricians, from Hippocrates to Lusk, have recommended, under certain conditions, cephalic version in podalic presentations. Deventer declares, in reference to manual interference in oblique presentations of the head: "It is more safe and easy to draw the infant out by the feet, though the head offers itself first, than to suffer it to come with the head first."

According to statistics presented by Zweifel, in 3475 versions the mortality was 58.9 per cent. Says Deventer: "If this operation of version and extraction of infants be cautiously and skillfully managed, the infant is not exposed to the danger of death."

That there was some peculiar feature in his mode of turning which he regarded as

a great improvement, as contrasted with the method commonly in use, is distinctly indicated in the sentence in which he challenges attention to "his successful practice for the past ten or twelve years." In a significant parenthetical statement he there says: "I place the time before that period with the time of my ignorance, having then used the art of midwifery according to the common method."

What, then, was Deventer's method? The following sentences descriptive of his mode of operating are collected from several passages in his book.

"The infant being turned gradually till it lies with its belly downward, is extracted till he is out above half way, and then it is time for the woman to labor, as we have elsewhere shown; for now the head and arms are to pass through at once, and though all authors that I know of teach the contrary, requiring that the arms be extracted one after another and should be placed along the body, yet I both think and have found the contrary. Wherefore, I positively advise that the arms be left about the head to be excluded along with it. I confess that the woman is obliged to force the infant with all her endeavors, but, like a small cloud, 'tis soon over. I most commonly prevent the woman from having pain till the infants are come so far (half way out), then allowing a little rest and encouraging her, I positively promise that if she performs her part courageously the birth will be presently performed; only for that purpose she must use all her strength to bring the infant forth, behaving herself as if the pains were pressing; pressing down with all her force; which, if you see the woman doing, she must be faithfully assisted by drawing the infant downward and with force, yet cautiously. I say downward, not upward; not according to the woman's length, as most midwives used to do, but downward toward the intestinum rectum, otherwise the infant would be wedged in tightly, and it could not shoot through easily. The greatest care should be taken that the head and arms pass together, which may be done commodiously and without danger to life, after the manner above mentioned.

"But if by chance the matter succeeds more difficultly than it commonly does, thrusting my fingers below I dilate the passage, or putting one finger into the infant's mouth, I gradually draw it down; in like manner, if the head presses with difficulty, which seldom happens, you may draw down one hand on the other, and thus clear the head further; but both arms are never to be brought down, for that would do more mischief than good." Do not wonder that the head and both arms may pass through the mouth of the womb at once; the method is less dangerous than the common one. The arms on both sides of the infant's head do not add so much to the thickness or impediment as is commonly thought, for the flatness of the temples affords them room, and the narrowness of the mouth of the womb being a part apt to extend, will admit to be a little further relaxed."

In reference to his success, I quote the following passages: "I have always taken this method to perfect the birth, and by that means not so much as one head has stuck in the mouth of the womb, nor have I pulled the head from the neck of any one infant, not even when they have been dead and putrid, but always by this method I drew them out whole, whether alive or dead. I dare freely challenge all about whom I have officiated or ministered to these ten or twelve years, and I can ingenuously assert that in all that time I was not with one woman that I know of (except one who was in fault herself) but that in a little time I completed the birth happily, without giving her any forcing medicine or using any instrument; not one infant being lamed, or its limbs broken (except that sometimes, though seldom, the mother being like to die, to preserve her life I opened the infant's head, which before stuck fast in the pelvis). Nor did I ever, that I know of, tear or hurt a woman in labor so that any inconvenience happened afterwards."

I append to these passages of Deventer an interesting quotation: "How much this new light (new method of delivering the after-coming head), illustrated by my experiments,

will add to obstetrical science, process of time will make evident. Any one whose eyes are not altogether overcast with mist may easily understand that what I have proposed in this book could not but proceed from attentive experience." Deventer's statement, that any unprejudiced reader could not but perceive that the suggestions made by him were the outgrowth of experience, is cogent. In my opinion no one can read his art of midwifery without the conviction that the writer's school was the lying-in chamber, and that he proved an attentive, intelligent and apt scholar. It is a very singular fact that Deventer should write a book for the purpose of describing, as he states, "the needful science of obstetrics faithfully and clearly for the advantage of his neighbors," and fail to describe therein either fully or plainly the most important features of his art. Certainly his mode of turning was the chief excellence of his practice; and yet a careful study of his work will fail to inform the reader precisely what his method was. So far as I am aware, to the majority of obstetricians Deventer's method means simply an omission to bring down the arms, coupled with a plan of drawing down the child in a direction perpendicular to the axis of the superior strait. The first light received by me as to the actual plan practiced by Deventer, was obtained from Smellie's article "On Delivery of the Head in Footling Cases." He there says: "Deventer and others have directed us to press the shoulders of the child downward so as to bring the hind-head first from below the os pubis." Again, he writes: "When the forehead is hindered from coming down into the lower part of the sacrum by an uncommon shape of the head or pelvis, and we cannot extract it by bringing it out with a half-round turn at the os pubis, we must try to make Deventer's turn in the contrary direction, and, instead of introducing our fingers into the child's mouth, let the breast of it rest on the palm of your left hand (the woman being on her back), and placing the right on its shoulders, with the fingers on each side of the neck, press it downward to the perineum. In consequence of this pressure the face and chin, being within the perineum, will move more upward and the head come out with a half-round turn from below the pubes; for the centre of motion is now where the fore part of the neck presses on the perineum."

Among Smellie's cases may be found several which serve admirably to illustrate the manner of applying Deventer's method. In a case in which the breast and both arms presented, after describing a difficult version, Smellie continues: "Finding on extracting the thighs and hips that the belly of the child was toward the pubes, I turned them to the sacrum. As the body came easily along, I did not bring down the arms, neither did I introduce my fingers to the face, to turn the forehead into the cavity of the sacrum, but by pressing down the shoulders of the fœtus, brought the occiput out from below the pubes. The child lay a long time seemingly dead, but at last recovered."

Smellie thus summarizes a case reported to him by Dr. Aires: "The woman was attacked with colic pains and convulsions. The doctor was obliged to bring the child footling, from its presenting with the arm; this he easily effected till it was extracted to the shoulders, where it stuck pretty much, and gave him great trouble in bringing down the arms. Then he tried with his fingers in the mouth to deliver the head, by pulling it upward toward the pubes; but finding great resistance, and pushing his fingers further up, he found the placenta down in the back part of the pelvis, which last, being very straight, had forced the head so against the pubes that it resisted all the force he durst apply. He then introduced a finger between the head and that bone to disengage it, but it answering no purpose, he seated himself on the floor of the room, and ordering the woman's breech to be brought a little over the side of the bed (she lying in a supine condition), he delivered the head by pulling the body of the child downwards. The child was dead, and, luckily for the woman, small in size, so that she recovered very well."

In the light which a hundred and sixty-three years have thrown upon the mechanism and management of labor since Deventer's day, what is the language in which his method may be described? It would be about as follows: The head enters the pelvis well flexed, with the face toward the back of the mother, and with the longer diameters in correspondence with an oblique diameter of the pelvis; as in ordinary head-last labors when the child has passed as far as the base of the thorax, extractive efforts should be made, the woman resting horizontally on her back, not in a line with the body of the parturient, but in a direction perpendicular to the floor. This line of traction continued, the chin comes to impinge against the posterior pelvic wall at a point in the perpendicular sacro-pubic plane of the pelvic excavation, from which a line drawn to the upper internal surface of the pubes measures less than that of the occipito-mental diameter of the head—say about on a level with the last piece of the sacrum; here the chin is arrested, and extension of the head begins; the occiput sinks into the pelvis, turning upon the chin as a centre of motion, and presents under the arch of the pubes. The antero-posterior diameters of the head pass through the coccygeo-supra-pubic plane of the excavation successively as follows: occipito-mental, maximum, mento-bregmatic. The mechanism of the passage of the head through the inferior strait of the parturient canal, the anterior circumference of which may be regarded as the pubic arch and the posterior as the arc formed by the greatly extended perineum, stands in contrast with that of an after-coming head, with the occiput backward and the chin riding up behind the arch of the pubes. The diameters which pass successively are the same in both positions, with the position of their termini reversed, namely, the trachelo-occipital, trachelo-parietal, trachelo-bregmatic. For the sake of simplicity in description, the mechanism of the passage of the head through the lower portion of the canal is given as if the antero-posterior diameters of the head and pelvis in that act were coincident; whereas, probably, the same influences which cause the head in occipital presentations to offer somewhat obliquely at the lower strait, would be operative upon it passing in the manner now under consideration.

When the arms are within reach an examination of their relation to the head should be made. Should their position be favorable, that is, on either side of the head, resting anteriorly to the parietal protuberances, delivery may be at once proceeded with. But, if the position be unfavorable, it should be corrected either by adjusting the arm to its proper site, or, in the event of that being impracticable, as in case the extremity were in front of the forehead, or behind the occiput, by bringing it down in accordance with established rules. In cases in which unusual difficulty is experienced, the fingers should be introduced between the perineum and the chin for the double purpose of dilating the soft parts and of making traction on the lower jaw; rarely it may be desirable to diminish the volume of the presenting parts by bringing down an arm, but only under very unusual circumstances are both arms to be disengaged. In the event of difficulty arising in bringing the occiput downward without employing a dangerous amount of traction, a strongly curved vectis, like that of Copeman, might be applied over the occiput from under and slightly to one side of the arch of the pubes. In the introduction of the blade in cases in which the uterus has contracted about a lower circle of the head, it might be well to avail one's self of the hint given by Deventer in reference to the fender-like action of the extended arms, namely, to seek to insert the vectis where, because of the presence of an arm, the constricting circle of the uterine neck leaves a space on the cranium spanned over rather than grasped by its circumference.

From the moment that the head enters the pelvis the mother must be earnestly called upon to second the efforts of the accoucheur by bearing down with all her power. After the arrest of the chin pressure should be made over the occipital end of the head as nearly behind the anterior wall of the pelvis as practicable, with the view of causing

descent of the occiput, and a relieving extension of the head. From experiments on the manikin it would seem that, in order to turn the occiput out from under the pubes to the best advantage, the child should be directed so far backward that its axis shall have departed from the axis of the mother more than ninety degrees. In turning, Deventer gives this direction as regards the position of the patient: "Lay the woman upon the back, the upper part of the body being lowest and the hips raised, that the womb and infant may go a little back." Now, if the position of the woman, as directed by Deventer for version, be taken into account, it will be seen that the child, in being drawn downward toward the floor, would be really extracted by traction "downward," and a little backward.

It is not perfectly apparent what was intended to be taught by Deventer in his recommendation, in cases where unusual difficulty was encountered in extraction, to pull down upon the chin. We may assume, especially considering the imperfect manner in which the mechanism of labor was understood at that time, that he, as his imitator Smellie did, occasionally drew upon the after-coming head when it was not in position to enter the superior strait; and that his recommendation, here commented on, was simply an outgrowth of his somewhat untutored experience, that when extension failed it was good practice to adjust and advance the head somewhat, by the older methods; or by bringing down the chin he might have intended to break the occipito-mental diameters at the angle of the jaw by depressing the inferior maxilla, thus substituting what might be called an occipito-oral diameter for the longer occipito-mental. Or we may suppose that this recommendation was perfectly in line with our author's plan of extension, and that what he suggested was simply to release the chin from the perineum by the fingers acting as a shoe-horn lever.

When extension of the head is well advanced, the arms are stretched relatively to the child's body upward and forward; so situated they are in the position of levers fast at their outer end to the shoulder joint, with their lower and outer surfaces impinging upon the tissues of the perineum, while within they are clamped more or less tightly between the face and pelvic walls. Drawing down the outer ends of these levers must have a tendency, on the one hand, to extend the head, and, on the other, to depress and stretch the perineum, holding meanwhile the latter structure off from the neck.

When most favorably situated the cord would pass from the child over the perineum, in the interval formed by the neck and the two arms, then through the space included between the sides of the forehead or face, the arm and the pelvic wall. Should it be found crowded upon by either of the salient discs of the presenting mass, an effort should be made to improve its situation. It must be borne in mind, however, in this connection, that the position of the funis is of minor importance in the delivery by extension, because by this method extraction of the head is effected promptly.

In Smellie's account of Deventer's method it is stated that the chin "moves more upward" as the occiput descends; the centre of motion being "where the fore part of the neck presses the perineum." According to my observations on the phantom, the mechanism is different. The chin does not ascend, and the movement of extension of the head takes place about it as a centre. The head, therefore, must be turned on its long axis in an antero-posterior plane of the pelvis. Because of the mobility of the sacro-iliac joints, the pressure of the chin against the lower part of the sacrum produces a nutation forward of the promontory, and a corresponding recession of the posterior pelvic wall. Through the opportune agency of the fibro-cartilaginous hinge of the occipital bone, and the commensurate moulding of other parts of the head in the same direction, a maternal shortening of the long diameters may be counted upon. With these favorable changes of accommodation in the "passage, and the passenger," the delivery of the head in the manner described becomes practicable.

There is a peculiarity of Deventer's method which seems to have been lost sight of,

and which, when duly considered, may throw light upon his plan and cause the claim of especial advantages for it to appear more plausible. It may be a fact that, in his mode of delivery, the arms present very much less hindrance to the advance of the head through the lower portions of the pelvis than in the old method. As the head nears the inferior strait the extended arms generally fall by a mechanical necessity into the slight grooves existing on the inner surfaces of the lower parts of the ischia, just anterior to the ischiatic spines. In the old method of procedure, the pelvis being narrower from side to side as the outlet is approached, the presence of the arms alongside of the head becomes more and more of an impediment as the head advances; the head seems to become keyed into the inferior strait by the two arms alongside of it. In Deventer's method just the contrary condition obtains. The arms, extended upward, pass over the antero-lateral planes of the head; these incline from the occiput in a direction opposite to that in which the head is being tilted by the delivering act of extension. In proportion as the head is dragged into the narrower portions of the pelvic outlet it is extended. As it is extended, it is withdrawn as a wedge from between the arms; for the act of extension carries the longer transverse diameters of the head out from between the arms in a double direction, relatively to the head, from behind forward, and from above downward. Finally the head, gliding out from between the arms, passes the vulva in advance of them.

Regard for a moment the ordinary method of delivering the head with the arms extended. The draft on the chin made by the accoucheur is such as to directly reverse the order prevailing in Deventer's method as just detailed. The arms are resting on the sides of an incline or wedge moving in such a direction as to clamp them firmer and firmer in the resisting pelvic walls, so that the arms and head must escape as one body, thus occupying a greater space than that taken up by them when passing the pelvis after the plan of Deventer.

In both methods of delivery the arms are especially crowded by the head against the tissues forming the outlet of the parturient canal. In the ordinary method the tissues pressed upon are underlaid by bone, the rami of the ischia. In Deventer's plan the less unyielding sacro-sciatic ligaments form the basis of the resisting parts.

It will be seen, then, that to extract the head with the arms alongside of it by a movement of extension is an entirely different procedure from such delivery with the head flexed. The caution of authors not to attempt to withdraw the child without bringing down the arms may therefore be considered to apply to the latter mode of delivery only. What are the particular advantages of Deventer's method? They are:—

(1) What Barnes might call the decomposition of the wedge of the shoulders; in lieu of the bis-acromial diameter presenting at the superior strait, it is the bis-axillary diameter.

(2) The arms extended upon the head bridge over the space between it and the body; thus extended they (*a*) act as fenders for the cord, keeping open channels through which the funis may pass uncompressed; (*b*) they antagonize that spastic contraction of the uterus which, closing in upon the lower circumference of the after-coming head is one of the causes of fatal delay in delivery in these cases.

(3) By this method the delivery of the after-coming head is very greatly simplified. In the majority of instances it may be unnecessary to interfere with the attitude of the head; Deventer claims that with few exceptions the head will "shoot through" both straits easily.

(4) The delivery by extension is very much more expeditious than the ordinary method. Precious time is not lost in bringing down the arms, inserting the fingers in the child's mouth, etc. As a consequence, if the experience of Deventer is to be relied upon, it would seem to be safer for the mother and very much safer for the child than other methods.

In three cases reported by Smellie, mention is made of the fact that Deventer's method was tried without success. In two of these, at least, failure resulted because delivery was attempted under conditions abnormal to ordinary labors. In one case the pelvis was narrow; and at the time of the trial of Deventer's method "the head was above the brim of the pelvis, with the forehead backward above the projection of the upper part of the sacrum." In the second case "the distortion of the bones was so great as to prevent the operator's hand from going up when the patient lay on her back." Smellie admits that the plan of Deventer had succeeded well under circumstances which he regards as suited for its accomplishment. He says: "Sometimes, indeed, I have found Deventer's method better than the other, when the head is low down, and the chief resistance is in the lower parts."

M'Clintock, in his editorial comments, says: "Although I have never tried Deventer's plan, I hesitate to condemn it."

After the presentation of so peculiar an obstetrical practice as has formed the subject of this paper, the question would naturally arise, What is the history of Deventer's method? Was he the originator of it? And if so, had he, and has he any followers?

I have not attempted anything like a thorough review of the literature which might lead to an answer to these queries. My reference has been limited to one hundred works on obstetrics. The authors of these, Smellie and M'Clintock excepted, make no mention of the particular mode of delivery that now interests us. Failing to find direct reference to Deventer's method, the student of the subject would naturally note any feature of delivery at all related to the practice under investigation; the mode of management of the arms in head-last labors is such a feature, and it may be interesting and profitable to cite the opinions of obstetrical authorities in regard to it. All of these* excepting those especially to be mentioned, are unanimous in the endorsement of the now prevailing practice of bringing down the arms. Some go so far as to state that without such disengagement delivery is very difficult; and one or two declare it impossible for a head to pass with both arms alongside of it.

Ambrose Paré directed that if both arms were found down, one should be replaced alongside of the head to protect the neck of the child from constriction, before extraction was proceeded with.

Some authorities insist that it is not always necessary to bring down the arms. Among these will be found Giffard, Froriep, F. C. Naegele, H. Fr. Naegele, Velpeau, Blundell, Merriman, Denman, Smellie, Heister, Gardien, Aitken, Reid.

Le Moine, Mowbray, Petit, Roederer, Henchel and Millot advocate the plan of leaving the arms extended, making no reference, however, as has been stated above, to any peculiar method of delivering the head in association with this practice.

Späth, M'Clintock and Johnston and Sinclair, in premature births, recommend that the arms be left extended above the head, that they may antagonize the spasmodic con-

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* Aegenita, Aitken, Aristotle, Bard, Barnes, Baudeloque, Blundell, Boivin, Burke, Burns, Burton, Bush, Byford, Capuron, Carus, Chailly, Cazeaux, Honoré Chapman, Churchill, Charpentier, Conquest, Davis, J. H. Davis, Denman, Dewees, Engelmann, Edinburgh Practice of Midwifery, Froriep, Galabin, Gardien, Giffard, Glisan, Gooch, Hamilton, Hardy, Hatin, Heister, Henchel, Hippocrates, Hodge, Ingleby, Jacquemier, Johnson and Sinclair, Joulin, Kilian, King, La Chapelle, La Motte, Landis, Lee, Le Moine, Levret, Leishman, London Practice of Midwifery, Lusk, Mauriceau, Maygrier, M'Clintock, Meadows, Meigs, Merriman, Moreau, Mowbray, Murphy, Naegele, F. C., Naegele, H. Fr., Osborne, Paré, Partridge, Pénard, Playfair, Plenck, Portal, Pugh, Puzos, Raulin, Ramsbotham, Rigby, Reid, Roedérer, Roberts, Ryan, Scanzoni, Schultze, Schroeder, Siebold, Simpson, Smellie, Tyler Smith, Späth, Spratt, Spiegelberg, Stein, Swayne, Tarnier, Tucker, Velpeau, Withington, Zweifel.

striction of the os, "which," they declare, "by embracing the head is apt to prove a cause of delay."

It is worthy of note that La Chapelle, Dugès, Jacquemier and others, in the worst irreducible forms of nuchal displacement, have forcibly delivered the head and arms together without serious results.

DISCUSSION.

Prof. SIMPSON said for himself, and he believed for all the members of the Section, they were greatly indebted to Prof. Bartlett for this very valuable contribution to their Transactions. He enjoyed the paper very much, because it was a revelation to him of the methods employed by Deventer in dealing with the after-coming head. He was in agreement with Dr. Bartlett in his admiration of the great Dutch obstetrician, whom he regarded as one of the most reliable of obstetric writers, and whose statements as to his success in practice he accepted without reserve. It was an interesting illustration of the importance of the relative study of the works of contemporary writers that it was from the works of Smellie that Professor Bartlett had been able to unearth Deventer's secret.

The demonstrations on the bony pelvis and on the manikin were extremely interesting, and helped one to understand the process. But to his (Prof. Simpson's) mind, the paper would have been increased in value if Prof. Bartlett had been able to adduce some cases from his own practice in which he had carried Deventer's procedure into practice. It seemed to him (Prof. Simpson) that the perineum would be more endangered than by the use of the methods with which we are more familiar; but, in any case, the paper was valuable in elucidating the practice of one of the fathers of midwifery, and in bringing clearly before the minds of the profession a method of delivery that, in special cases, might prove to be of unexpected importance.

Dr. CHARLES T. PARKES, Chicago, related the histories of three cases of the delivery of the after-coming head and upper extremities, by Deventer's method, after failure of the ordinary modes of delivery.

Dr. GEORGE WHEELER JONES, Danville, Ill.—Having asked Dr. Bartlett a question in regard to the position of the mother, he asks me to state the facts in regard to three cases of delivery by Deventer's method. They occurred with the mother upon the left side; the limbs were separated, and the first one took place almost spontaneously after the change in the position of the mother to the side, for some special reason not now remembered. I know I was alarmed the first time, as the child was a large one, and I feared perineal rupture, if not worse. In moving the child for a moment to arrange the mother's limbs a little traction was unavoidably made backward upon the body, the head advanced with a powerful pain, and the child in a few moments was delivered fully, swinging around to the mother's back—no injury whatever to the perineum, and no cessation of pulsation in the cord at any time. The other two cases were very similar, except I felt no alarm, but hastened to assist in carrying out what I chose to believe might be nature's method. I now fully believe this to be the case, after the brilliant demonstrations we have received to-day of Deventer's plan, for we are told he was truly nature's student. If the face of the child is advancing to the pubes the whole body should be turned while the head is still above the strait. I shall hereafter have no hesitation in arranging for and recommending delivery by this plan, being able now clearly to describe its character, and give it high authority.

Prof. A. F. A. King, Washington, D. C., considered Dr. Bartlett's paper one of the most interesting of the whole Obstetric Section. The method of Deventer had been overlooked by modern writers. Dr. King said the method of traction downward and backward toward the perineum was generally recommended when the occiput had rotated posteriorly and the chin pole was *below* the pubis, but generally it was advised to deliver the arms first. I shall take pleasure in trying this method and recommending it as a legitimate proceeding in delivery of the after-coming head.

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# THE IMPORTANCE OF CAREFUL DIAGNOSIS OF PREGNANCY, WITH THE HISTORY OF A CASE OF RETROFLEXION GOING TO FULL TERM.

## L'IMPORTANCE D'UN DIAGNOSTIC SOIGNEUX DE LA GROSSESSE AVEC L'HISTOIRE D'UN CAS DE RÉTROFLEXION ABOUTISSANT AU PLEIN DÉVELOPPEMENT.

## DIE WICHTIGKEIT EINER SORGFÄLTIGEN DIAGNOSE DER SCHWANGERSCHAFT.—GESCHICHTE EINES FALLES VON RETROFLEXIO UTERI MIT NORMALER SCHWANGERSCHAFTSDAUER.

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There was a time, and that not long since, when the study of the pelvic viscera was considered of little consequence from a surgical standpoint. The uterus and all the pelvic organs might have occasioned considerable distress, and still not have been subjected to any special treatment.

That time, however, is past, but, alas! for the present: if any of these organs should give utterance of any discomfort, through the lips of their possessor, they would soon find themselves victims of intoleration, doomed to premature separation, decay and dissolution, or perhaps to be kept in some preservative liquid on exhibition, to add confidence and reputation to the many whose ambition and enthusiasm have developed in this direction.

It is said, however, that one of our most celebrated gynæcologists has declared that, "in five years from the present (1887), every surgeon who has spayed a woman will apologize for having done so." May the chariot of Time speed rapidly along to usher in such a revolutionary epoch.

If we were looking forward, and judging alone from the present increasing rate of operations in this department, the universal dread and inference would be, the unsexing of a vast number of females, and their consequent unfitness for the marriage relation.

It is to be sincerely hoped that science will soon reveal to the gynæcologist, for the benefit of woman, some better method of preventing disease of her generative organs, and the suffering that it entails. It seems, at the present time, there are scarcely any of the female sex who can claim absolute freedom or exemption from pelvic distress.

Volumes are written on the different maladies and the numerous methods of opera-

ting, so that medical dictionaries fail to keep pace with the mushroom growth of names for new diseases and the operations devised. Pounds of remedies are prescribed, but not one ounce of prevention is suggested.

Why this disproportion?

Is it because it is more glorious to fight the battle than preserve the peace? Or is it because such a morbid desire has taken hold of us that, Nero-like, we could wish that all the diseases of the sex could be concentrated in one locality, that our skill and dexterity might become more famous?

With your permission, let us, during the few moments allotted, concentrate our thoughts on some of the causes which disturb the healthy action of the female generative organs, and also illustrate some of the mistakes which occur as a result.

The female generative organs are situated between the bifurcations of the abdominal aorta; from these they receive their supply of blood in sufficient quantities to meet the necessities of the uterus during gestation, and for this reason the uterus may be said to become a vascular tumor.

The blood, once conducted to the uterus and pelvic organs, must also have a free escape from the same, in order that no interruption be made in the circulation.

The arteries, the medium through which the blood is conveyed to the extremities, are found to lie deep in the interior of the body and limbs, and are not provided with anything that might obstruct the passage of the blood, while, on the other hand, the veins are found more abundantly near the surface, and are provided with valves as nature's protection against exhausting hemorrhage should they be lacerated.

Nature has, evidently, done her part; how do art and fashion assist nature in carrying out her principles?

We have, in the female of the period, a low contracted waist over an unresisting part of the body, bound in by a steel-clad corset, which paralyzes, to a certain degree, the muscles of the abdomen and back, and leaves the person who has been victimized by them feeling almost broken into two parts when, from any cause, she attempts to exist without their support.

But if this were all the injury done, we still might be content to gratify a perverted notion of beauty. Let us consider for a moment the additional injuries which are still more painful and deplorable.

The contents of the abdomen are forced down into the pelvis and upon the pelvic viscera, which, in consequence, are more or less displaced; adding to this condition the effect of the constriction upon the surface venous or return blood, which is thus hindered in its passage upward, are we surprised, when we sum the effects of such abuse to nature's work, that the result is congestion and hypertrophy of the pelvic viscera, causing a stagnation of the blood and consequent arrest of functional activity, giving rise to an outbreak of disease? Who has not seen the confervæ on the surface of the water where it has been hindered in its course, as in the pond or mill dam, spread and develop until its malarious influences affect the entire community. Just so with the fashionable woman. How can she expect to be free from suffering, and remain fit for the married relation, if she will persist in dividing her body into two parts, and allow both to be supplied with the necessary vitality from but one heart, at the same time expecting a healthy condition to remain in that part which is heartless and more or less hindered in the circulation of the vital principle of her being?

Can we not readily conceive of various inflammatory processes that would result from such stagnation of blood?

Is it strange that we hear so much in this our day of the numerous cases of pelvic cellulitis, salpingitis, ovaritis, metritis, and the various tumors and displacements, etc., resulting therefrom?

Can we estimate the effect upon the characters of those who would be thus wasp-waisted?

Does not the local congestion in the organs of generation create an amorous and lustful disposition, and have a tendency to lead to practices too debasing even to record on paper?

Is it possible that there is a strife going on between the leaders of fashion and the gynecologists, the location being that part of the body occupied by the pelvic viscera? The one is bombarding from above with an environment of steel-clad corsets; the other is striving to resist from below with all kinds of ingenious instruments of support called pessaries, and the poor simple-minded female submits to it all as the tortured victim of fashion.

What will we do or suggest to prevent all this misery of the female generative organs?

First: Remove the causes that assist in producing the complaints.

Second: Change the fashion so that the waist will be thought to be most elegant and genteel when it is—as in former times, when health, vigor and virtue prevailed—as high and as close under the mammæ as possible, where the compression is resisted by the ribs and does not interfere with the circulation, the muscles of the abdomen, nor with the internal viscera.

The use of the corset could not then be desirable. When such was the former fashion, separations and divorces were of rare occurrence; instead of the female being a constant whining complainer, she possessed a vigor and strength of physical frame equal, in many instances, to the opposite sex.

That this hearty, healthy condition did exist is evidenced by the antiquated survivors, who regard the female sufferings and diseases of the present time as disgraceful.

But I must not dwell beyond my limit; this which we should feel to be a matter of great concern, as it involves so much suffering, risk to life, decline of national existence, and last, but not least, degradation of the sex, has, no doubt, been thought over by all of you who do me the honor to listen at this time.

It does not seem necessary to dwell on the importance of careful diagnosis of pregnancy, nor to take up your valuable time in citing a long list of painful facts.

We regret to bear testimony to the fact that, to our own shame, these mistakes have been legion, as we have in the rare case of retroflexion, which we are about to narrate to you, also a typical case of a succession of blunders. We will find that it is not alone the young and inexperienced who are culpable for these mistakes, but we regret to record that some of those of large and ripe experience have, from unfortunate judgment, been led to commit fatal errors.

As the history of the case to which I particularly desire to call your attention is unique, and, therefore, one of special interest, I will limit myself to the narration of it as illustrative of what proved to be a case of mistaken diagnosis.

The history of the case is as follows: Mrs. Letitia H., aged twenty-nine years, the mother of three children, had been attended in her previous confinements by the writer.

In the summer of 1883, one year after the birth of her last child, on account of her husband's financial embarrassment and inability to pay the bill for professional services already rendered, a female physician was consulted by the patient. The last menstruation which had occurred was in the month of May of the same year, or two and a half months before the time referred to. An examination was made, and the startling intelligence given that a tumor was growing in the posterior wall of the uterus: She was further advised of the advantage of immediate attention.

In her alarm, one physician after another was consulted, until she came into the hands of a noted and skilled gynecologist, who confirmed the former diagnosis, the size of the tumor being estimated as that of an orange.

Being assured that its removal was an easy matter and not attended by great danger, she yielded to persuasion and consented to submit to the operation.

The day and time for this was fixed; but as they approached, forgetting, for the time, her pecuniary obligations, she began to think of him who had stood by her at a time when she was given up to die of double pneumonia complicating pregnancy at six months, which terminated in a miscarriage. Accordingly, she called at my office, made profuse apology, and begged me to be present at the operation, which was to be performed in two days. She also requested that, being an old patient, I would examine her condition and give my opinion as to the necessity of the operation. On introduction of the finger within the vagina, an oval mass, about the size of a small orange, was found to occupy Douglas' cul-de-sac; further examination revealed forward and upward displacement of the cervix.

Being satisfied as to the cause of the enlargement the patient was advised not to think of submitting to an operation; to go home and remove corsets and all tight-fitting clothing, and to return within a month, that the process of the development might be carefully watched.

On her third return, at intervals of several weeks, she brought a letter which she had received from the intended operator, requesting her to go and see him, as he was desirous to know how the tumor was growing, and offering to make no charge for such examination.

By this time, however, the patient had quickened, and having such evidence of the mistaken diagnosis, her confidence was too much shaken to gratify him in this way.

Now came the dilemma; for the period of quickening had arrived, and instead of the uterus being in its normal position, a still larger mass was found filling the cavity of the pelvis. Not having had the responsibility of the case from the first, and being interested in its progress, the replacement of the organ, which is the recognized practice in such cases, was put off, with the hope that nature's efforts would accomplish the desired results. Such was not the case, however, and at this late period the attempt at replacement seemed hardly justifiable, so that nothing whatever was done.

At last, she having gone to full term, the summons came to wait on her in labor.

The feeling of guilt at first, for permitting such a condition to have existed all of this time, was overpowering.

The question that arose was, what could be done to save the life of the mother, and, if possible, that of the child? Could delivery be effected without the use of the knife?

Encouraged by the favorable termination, as far as the mother was concerned, of a somewhat similar case, it was decided that every effort should be made.

At the first visit, made on Thursday morning, January 17th, the patient was found having light pains at long intervals. A digital examination was made, and after much difficulty, the exact condition was determined.

The cervix was found to be relaxed and the os partially dilated. The vertex presented, and was above the brim of the pelvis in the second position; almost the entire cavity of the pelvis was filled with the fundus and a portion of the body of the uterus, containing the breech of the child. After a thorough examination, it was not considered necessary to remain, but about every six hours she was seen, until forty-eight hours had elapsed, dilatation being then about complete, and the patient showing evident signs of exhaustion.

That something must be done, and that promptly, was fully realized.

The patient was requested to take the knee-chest position, and then, with the left hand on the abdomen while the right was introduced within the vagina, the dorsal surface being toward the sacrum, the attempt was made; as the right hand made firm upward pressure against the fundus of the uterus, the left was engaged manipulating

the abdomen. The fundus at once yielded to the pressure, and was soon pushed above the brim of the pelvis, after which the patient was told to lie down on her left side; in so doing, the removal of the left hand from the abdomen was necessitated; but feeling we had succeeded in putting the fundus in position for a successful delivery, we were waiting for nature to take her course without further interference.

To our great chagrin, however, the first pain threw the fundus back into the cavity of the pelvis. Once more our patient was requested to assume the knee-chest position, and with equal ease we again were able to restore the fundus; but as we did so, applied our left hand to the support of it through the abdominal wall, at the same time requesting the patient to lie down on her right side, facing us, so we could keep our hands in position and prevent the uterus falling back again into the cavity of the pelvis.

The first pain that followed caused the amniotic sac to protrude through the well-dilated os; this was promptly ruptured by the right hand, which was still within the vagina, helping to support the uterus. After rupturing the membranes, the second stage of labor was terminated by the first pain; this part was accomplished so rapidly and with such ease, that it was hard to realize deliverance from the fears and forebodings which, but a moment previous, were overwhelming us.

There were no special untoward symptoms in the recovery of the mother, and the child (a male), which weighed six and one-half pounds at birth, is still a living evidence of the continuous development of some fibroid tumors, even after their removal from the uterus.

There being only two other similar cases on record, one that of Merriman, the other reported by Dr. Henry Oldham before the Obstetrical Society of London, December 7th, 1859, in which the presentation was that of the breech, the delivery of a *dead* child having been effected with some difficulty, it has seemed to me a duty which we all owe to our profession to bring this case before you, as not only one of special interest on account of its rarity, but as one of the possible complications of gestation and labor.

## DISCUSSION.

Dr. Philip C. Williams, Baltimore, Md.—The case of Prof. Stewart is one of great interest, and presents the practical questions: What was the duty of the doctor when he diagnosed pregnancy at four and one-half months? Was it possible to replace the uterus? Was it not his duty to do so? These are practical questions which each must decide for himself.

I had a case that presented a similar complete retroversion discovered at the fifth month. I was called to a patient suffering with apparent labor pains. Vaginal examination revealed a firm, well-defined tumor in the cavity of the sacrum. I supposed it to be a fibroid in the posterior wall of the uterus. More careful examination discovered the cervix behind the pubes, and revealed a case of complete retroversion. This was reduced without serious difficulty, but I could not avert the abortion, which took place about an hour after replacing the uterus. The cause of abortion was ascertained to be a complete bilateral rupture of the cervix; the rupture extended to the vaginal junction. The woman refused to undergo an operation, and the injury still exists. An interesting fact in this case is, that notwithstanding the complete rupture of the cervix, this patient, since the abortion above described, has again become pregnant, and was recently delivered of a living child by a professional friend. To me it is strange that such an extensive rupture would permit a pregnancy to go to full term.

Prof. Rodney Glisan, Portland, Ore.—This is an exceedingly interesting case

of false diagnosis related by Prof. Stewart. I have had many cases of retroflexion of the uterus where pregnancy coexisted, but never a case where the pregnancy went to full term without replacement, either natural or artificial, of the womb. I think that a mistake was made when it was discovered, about the fourth month of pregnancy, that there was a displacement of the uterus, in not immediately rectifying it. I am satisfied, from my own experience, that the operation would have been successful.

I shall relate only one example of several similar cases that I have seen. About ten years ago, I was called to see a patient who was suffering from uterine hemorrhage and agonizing uterine pains. Upon examination, I found, pressing down in the vagina, a tumor resembling a fibroid. Upon inquiry, it was ascertained that the patient had not had her menses for five months. She was normal, but had never given birth to a child. After a careful examination, I came to the conclusion that the case was one of pregnancy of four and one-half months, complicated with retroflexion of the uterus. Placing the woman in the knee-chest position, I had but little difficulty in rectifying the displacement. Labor pains, however, continued until the expulsion of the fœtus and secundines; but after the replacement of the organ, the pains were not so intolerable as they had been prior to the operation.

My conclusion, therefore, is, that the obstetrician having the case related by Prof. Stewart in charge should have replaced the displacement of the womb, even at four or five months' pregnancy. Of course, the Professor is not to be blamed in the matter, as he had no control of the patient.

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## THE INFLUENCE OF PREGNANCY IN THE DEVELOPMENT OF LITHIASIS.

### L'INFLUENCE DE LA GROSSESSE DANS LE DÉVELOPPEMENT DU LITHIASIS.

### DER EINFLUSS DER SCHWANGERSCHAFT IN DER ENTWICKELUNG DER LITHIASIS.

BY J. E. KELLY, F.R.C.S.I.; M.R.S.A.,

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The frequency, in pregnant females as well as in those who have already borne children, of certain conditions and symptoms which, under other circumstances, would be attributed to acute or chronic gout, has not escaped the notice of the intelligent physician, although it would appear that adequate importance has not been attached to the association. The omission is the more strange when we recall the fact that the phenomena of pregnancy have a definite tendency to develop in the maternal system the very conditions which are conducive to and pathognomonic of lithiasis. When examining the numerous disturbances of health which are observed during gestation, we must be struck by the perfection of design which is so well sustained by such an investigation, because we find it difficult to discover any disease which can be regarded as exclusively and directly the product of the natural and essential process of reproduction of species. On the other hand, we find that the great majority of diseases of pregnancy are merely

phases of those which are found in other conditions in the male and nulliparous female, under different appellations. A very numerous class are those which present themselves under the multiform manifestations of lithiasis or gout, which affect the structure and the functions of nearly every organ. We may exclude the uterine and other lesions consequent upon mechanical influences and the many evils resulting from the exigencies of the so-called civilized life, with the observation that such conditions occurring after pregnancy appear to be largely modified by local congestions and inflammations similar to those which we witness so frequently in lithiasis. The efficiency of a combination of antilithic treatment with special uterine therapeutics is recognized by many gynæcologists, and it indicates an important connection between female disorders and lithæmia. Another association which sustains the theory is the frequent adoption by the system, as in lithiasis, and resembling it, of a diathesis which manifestly has its origin in the phenomenon of pregnancy. The persistency of this condition is shown by the progressive character so frequently seen in many diseases which are first recognized during or shortly after gestation. If we consider the physiology of gestation, our attention is first attracted by the increased demand which is made upon the functions of the maternal, especially the excretory, organs. In addition to the greater work thrown upon them by the maternal system, they must also perform the labor of eliminating the effete matter from the rapidly growing and constantly changing utero-fœtal mass. We also find the nutritive organs similarly taxed, and necessarily the circulatory system of the mother is called upon to increase its functions, and when, in too many instances, it is incapable of responding to the strain. That the condition termed by Hervieux "puerperal toxæmia," which necessarily exists in all pregnant females, should manifest itself only in exceptional cases is a problem which may admit of many solutions; but the initial capacity of the maternal organs, the degree of metabolic activity in the fœtus and the constitutional resistance of the mother, comprise the more important of the probable factors. The coincidence which exists between the diseases of pregnancy and lithiasis, and the similarity of pathological changes in the two conditions, merit our attention. The blood in both conditions is deficient in cells and the solid elements also, except the excrementitious matter and the fibrin, which are in excess; its specific gravity and its alkalinity are reduced. It is hardly necessary to mention the causes which produce these hæmic conditions in lithiasis, but a brief consideration of the phenomena of gestation will indicate them. The anæmia is due to the disturbance of the constitution, the increased demand on the constructive powers of the mother and the great addition to the volume of the circulatory fluid. The last-mentioned cause, while not diminishing the total number of red corpuscles, other things being equal, must lessen their proportion to a given quantity of the blood. The nutritive solids are so rapidly removed from the maternal blood, owing to the exacting demands of the rapidly developing fœtus, that it is only in those rare cases of unusual assimilative power that the quantity is not below the average and but the excrementitious matter from the utero-fœtal system added to that of the mother, which is already in excess in consequence of the greater activity of function, must almost necessarily increase these ingredients above the normal standard. The deficient alkalinity of the blood is largely due to the basic elements being constantly removed, owing to the necessities of the fœtus, which sets free the acid constituents, and to the activity of the maternal and fœtal livers, which produce a large quantity of lithic acid which, while it may not add to the appreciable acidity of the blood, by combination with the various bases liberates the other acid constituents.

In this connection it may not be out of place to consider the subject of certain uterine and intra-uterine lesions which, as yet, have not had a satisfactory explanation. It is quite possible that the occurrence of adherent placenta may be due to the inflammatory predisposition resulting from the lithæmic state of the blood combined with

some accidental or acquired exciting influence; as, for instance, a contusion of the mother's abdomen, a vigorous fœtal movement, or antecedent local disease. That such an exciting cause may have an efficient influence is rendered probable by the inflammation following very trivial injuries in gouty subjects, which is generally of a plastic character; as, for example, thæcal inflammation and gouty iritis. If we extend this view to the intra-uterine diseases and deformities it is only necessary to remember that many of them are due to the development of lymphous exudation, which, by subsequent organization and contraction, strangulates and eventually causes atrophy or even amputation of the included fœtal structures. The presence of an excessive quantity of fibrine in a fluid of low specific gravity and deficient alkalinity may also explain some maternal and fœtal cases of cardiac disease, as well as of embolism and thrombus. It is unnecessary to say that the fœtal blood most probably presents many characteristics which approximate to those of the maternal fluid. Various cardiac and vascular lesions occur in gouty patients, as well as during and subsequent to gestation; and it is convenient at present to consider the additional influences which are developed during the last-mentioned condition. The more vigorous cardiac action and the higher vascular tension, at least in the later months of pregnancy, are due to the greater quantity of maternal blood, together with the additional resistance offered by the utero-placental vessels, owing to the stasis in the uterine lacunæ and the osmosis occurring in the placental circulation. The heart becomes hypertrophied, and it is probable that this conservative or adaptive change is of the eccentric form. The more forcible action of the cardiac muscles increases the mechanical violence by which the passive structures of the heart are compelled to perform their functions, and the consequence is that they are more liable to localized inflammation at the areas of impact of the valves and at the points of traction of the chordæ tendineæ. These structures become susceptible to plastic infiltration and deposition, resulting in stenosis, valvular insufficiency and the development of "vegetations," which conditions may be complicated with cardiac hypertrophy, atrophy, dilatation or degeneration. It is interesting to remember that, according to recent observers, although the maximum pulsation is not increased during gestation, the sum of the systolic actions in the twenty-four hours is much greater than in the non-pregnant female, as is demonstrated by their ordinary diminution upon the assumption of the sitting or the recumbent posture. If such a phenomenon should be verified it may afford a valuable indication of the existence of pregnancy in dubious cases. The relation between gestation and the respiratory function is particularly important in the present investigation, owing to the deficient oxidation, which prevents the easy elimination of lithic acid in the form of urea. The transverse expansion of the thorax observed in gestation may not be sufficient in every instance to compensate for the limited movements of the diaphragm caused by the encroachment of the abdominal contents. These influences aid in producing the inefficiency consequent upon the increased demands upon the respiratory system, but the recognition of the centre which is credited with the control of the formation of lithic acid, in close proximity to the respiratory centre, may have a peculiar interest in our investigation.

The digestive system is closely associated with the disturbance of gestation, and presents constant examples of sympathetic and organic disturbance. The stomach is generally in a condition of greater activity, the amount of ingesta is increased, the irritability is greater, and dyspepsia is the frequent result of this combination of circumstances. The intestines participate in the general derangement. The varied functions of the liver, which most probably are taxed additionally in pregnancy, render this organ liable to numerous disturbances, especially if it should be unequal to the additional labor. It is but natural to assume that the elaboration of glycogen should be greatly increased by the requirements of the fœtus, and, consequently, that hyperæmia

should be established, passing, by an easy gradation, into inflammation and its many developments, even to that disastrous disease, acute yellow atrophy. This disease appears to have a peculiar association with gestation. The establishment of the liver as an active and potent organ in the production of lithic acid is also confirmatory of the proposed theory, and it is very possible that investigation may establish another link between the two conditions by demonstrating the existence of an abnormal quantity of lithic acid in the maternal or fœtal spleen, as has been done already in the lithæmic subject. This speculation gains some scientific interest from the established association between the sexual functions in females and leucocythæmia, a disease in which the spleen is regarded as the principal factor.

As in the other maternal organs, much additional labor is thrown upon the principal excretory organs, the kidneys. In the normal process of gestation the volume of urine is notably greater than in the unimpregnated female, and all the solids are discharged in larger quantities. It is but fair to assume, from analogy, that the kidneys become hypertrophied by the continual increase of their functional activity, for in disease and experiments, when one of these organs is destroyed or removed, the remaining organ increases proportionately to the assumed functions. The frequent occurrence of renal disease in pregnancy is well known, and it is most probable that it is largely due to the hyperæmia resulting from the condition in a subject constitutionally or organically incapable of sustaining the additional strain, affording another example of the well-recognized association of weakness and irritability to which so many diseases are attributable.

The phenomena manifested in the nervous system during pregnancy may be regarded as being indicative of the generally exalted functional activity. It is quite possible that some occult association may exist between them and the formative necessities of the fœtus, which may contribute to this tension. The influence which the hæmic conditions exercise upon this system are more obvious, and we can recognize many of the phenomena as clearly resembling ordinary gouty symptoms. That complex symptom of vomiting in pregnancy, upon which I have endeavored to throw some light in a paper termed "Causality in Disease" may afford another clue to the connection between pregnancy and nervous disturbance. The influence of pregnancy upon the mechanical and muscular structures is marked; we are accustomed to witness the effects of the unwonted demand on nutrition and of the defective excretion. Mollities ossium is the best example of the former, and it is found with such suggestive frequency in females during and after pregnancy as to be regarded as more than a coincidence. The deficiency of the excretory organs is indicated by the prevalence of rheumatoid and several other arthritic complications, by the frequency of rheumatism and spasm or cramp of the striated and non-striated muscles.

The diseases of pregnancy which are analogous to disturbances in lithiasis may be classified most conveniently according to the order adopted in this paper. Those most intimately associated with hæmic disturbances are eczema, pruritus, phlebitis, lymphangitis, œdema and dropsy; with the heart, palpitation, irregularity of action, syncope and organic disease; with the vessels, arterial degeneration, aneurism and varix, embolism; with the respiratory system, hiccough, irritable cough and dyspnœa; with the intestinal tract, irregular appetite, dyspepsia, gastric acidity, cardialgia, nausea, vomiting, irritative diarrhœa, constipation, lymphangitis; with the liver, pigmentation, jaundice and hepatitis; with the urinary organs, hyperæmia, acute and chronic parenchymatous nephritis, polyuria, diabetes, suppression and retention of urine, irritable bladder and cystitis; with the nervous system, insomnia, irritability, physical, sensational, spasmodic and trophic phenomena, convulsions and hysteria; with the skeletal and muscular structures, osseous laminæ and exostosis, inflammation, contraction and

rigidity of tendons, sheaths and fasciæ, synovitis with adhesions and induration, myalgia, cramps.

The mechanical effects ascribed to pregnancy are accredited with producing various lesions which are constantly found in cases of gout. If we classify them according to our previous scheme, we find that the heart is supposed to suffer from the invasion of the thoracic space with the effect of producing irregularity of action. The vascular system manifests a tendency to arterial obstruction, varix and lymphatic engorgement; the intestinal tract presents gastric irritability and constipation; the liver obstructive jaundice and other symptoms; the urinary organs are supposed to suffer from obstruction of the renal veins and ureters, irritability of the bladder and urinary retention. It would be unjust to doubt the presence of the mechanical element in the etiology of these conditions, but we must not forget all of them are found in males and virgins, particularly in those whose other ills are complicated with the lithæmic diathesis. It may be well to dwell upon the conditions which are supposed to govern the hepatic and urinary disturbances. That the hepatic duct can be compressed by the uterine mass is improbable, when we remember the protected position which it occupies from its origin in the sulcus, between the quadrate and Spigelian lobes of the liver, whence it passes between the folds of the lesser omentum, protecting the stomach and liver, to its position behind the deodenum, upon the inner and posterior aspect of which it discharges its contents. In one way it is possible that the uterus may produce mechanical obstruction, in the later months of pregnancy, by the displacement, *en masse*, of the liver upward and backward, when an unusually short duct coexists. The influence which the uterus can exert upon the renal veins must be slight, as has been indicated by recent writers, (except when the woman assumes the dorsal decubitus) owing to the tendency which the uterus manifests to describe a curve with its convexity backward, and with only its exterior extremity fixed at a point within the pelvis. For the same reason the ureters are protected in their abdominal course, except in some cases of lateral displacement of the gravid womb. Within the pelvis, however, the conditions are different, and deserve our consideration. Here the ureters lie in close proximity to the cervix, and every enlargement and displacement must affect them mechanically, especially when any inflammatory or other adhesions coexist. It is possible that this consideration may afford a clue to the explosive phenomena which occur in the later months and during parturition. It is possible that effects upon the bladder are due rather to traction on the ligaments and nerves of the organ, which transmit a stimulus to the micturition centre in the cord similar to that produced by normal distention. It is not clear that the irritation of pressure can have much influence upon the bladder, except during the earlier periods of gestation and during parturition. The familiar experiment in the lower animals, of ligation of the ureters, may cast some light upon a condition which appears anomalous, namely, the absence of an increase of temperature, when we consider the relation of the ureters and the cervical development. In this experiment it is observed that the pulsations diminish to a marked degree; and here again an interesting association may be established between the nervous centres in the floor of the fourth ventricle.

In this review of the two conditions, I endeavored to impress upon my audience the existence of a connection more than casual between pregnancy and lithiasis, and if I have succeeded in directing the thoughtful members of the profession to the elucidation of the proposition which I propound, and the practical members to its application, I shall consider that my labor is not in vain. The idea took possession of my mind slowly, and I shall only ask my hearers to consider it from the same philosophic standpoint of impartiality. The absence of references to authorities may be a defect, and some of my hearers may suspect me of an uncandid affectation of original research and experiment, but as I only claim the kaleidoscopic rearrangement of the particles

of knowledge contributed by other men, and disclaim all originality, except in the process of reasoning, the tiresome and disturbing practice of formal quotation is omitted, as much for my own convenience as for that of my readers. The speculative character of this paper may be condemned, but in this material age of experiment and observation even a weak contribution to the philosophy of medicine may not be without its utility.

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## STILL-BIRTH; RATE AND CAUSES.

### MORTS-NÉS; PROPORTIONS ET CAUSES.

### TODTGEBORENE KINDER; NUMERISCHES VERHÄLTNISS UND URSACHEN.

BY E. P. CHRISTIAN, M. D.,

Of Wyandotte, Mich.

While the rate and special causes of maternal mortality in parturition can be fairly estimated from easily attainable and approved data, the cause is different as regards the infantile pre-natal mortality. It is only an occasional systematic work on obstetrics that gives even statistics of the various accidents and complications of labor dangerous to the child as well as to the mother, and of the proportionate mortality therefrom. Yet the aggregate of still-births is only partially made up from these causes, and I have not discovered in such works any estimate of the proportion of all still-births, nor data sufficiently comprehensive from which to make an estimate. The same may be said of reports and statistics of lying-in institutions. The maternal mortality is given, but the infantile, if at all, only from special complications.

Census statistics are, and will continue to be, unreliable on this point, because they will necessarily fail of accuracy in regard to one class of still-births, viz. : those of illegitimate children. The most valuable information on the subject, in some respects, is gathered from statistics of private practice, as published by individuals in the journals. But these are from comparatively limited numbers, and a just estimate cannot be made from them as to the usage for all births. The showing would be altogether too favorable, for various reasons, and among them that lying-in institutions will have larger numbers of complicated labors, and particularly more still-births, by women infected with specific diseases. Even in private practice there will be great variation in individual experience in the number of difficult and complicated cases of labor, and, therefore, of the rate of mortality, both maternal and infantile.

When a physician reports a series of several hundreds of consecutive cases of labor without a still-birth, however highly such a showing may commend his skill in the management of the cases he has met with, yet it testifies rather to his good fortune as regards the class of cases which have not come under his care. It may be assumed that his practice has been exceptionally free from many of the complications of labor and of pregnancy hazardous to the child, to say nothing of mal-presentations and of difficult and retarded labors from whatever cause; that he cannot have met with the normal ratio for large numbers of cases of eclampsia, of placenta prævia, of prolapsus of the funis; that he has been exceptional in not having dead and putrid fœtuses, their deaths antedating labor days and even weeks, and the causes of which may have been violence to the mother, or uræmic poisoning of mother, or syphilitic disease, or fatty or other

degenerations of placenta, or partial separation of placenta, or from many causes aside from dangers of labor, *per se*. And therefore, however creditable and interesting such statistics, yet they alone will not afford any fair basis for estimating the general ratio of still-births.

To form an approximate estimate of the normal ratio of still-births from some of the more common complications and accidents of labor alone, I have made calculations from the table of Dr. Churchill as to the ratio of occurrence of these complications, and the infantile mortality therefrom, which will give a clearer idea of the exceptional character of some published statistics than we might otherwise be enabled to gain :—

| Presentations. | Labors. | Per 1000 Labors. | Children Lost. | In 1000. |
|---|---|---|---|---|
| Face | 1 in 222½ | 4½ | 1 in 7 | .64 |
| Breech | 1 " 59½ | 17 | 1 " 3½ | 5.00 |
| Infr. Extremities | 1 " 108 | 9¼ | 1 " 2½ | 3.70 |
| Supr. Extremities | 1 " 234¾ | 4¼ | 1 " 2 | 2.25 |
| Prolapsus Funis | 1 " 218 | 4 6/10 | 1 " 2 | 2.30 |
| Hemorrhage | 1 " 122 | 8¼ | 1 " 3 | 2.73 |
| | | | Total— | 16.62 |

Here is represented a normal loss of children from these accidents alone of nearly 17 in 1000 of labor, or nearly 1.7 per cent.; but in this estimate, in hemorrhage, which includes placenta prævia, the loss is computed as but one in three, whereas, though the complication is one of the rarer ones, yet the loss of children from that cause of hemorrhage should be computed at seven-eighths of the cases. Then, again, there are twin births, which may be estimated as occurring in the ratio of 1 in 83 labors, or 12 cases per 1000 labors, with a loss of children of 1 in 4, or 3 per 1000 labors. And though this loss is for the most part included in that computed for presentations of breech and of inferior extremities, yet it is certain that the whole loss in twin labors is not alone from such presentations.

There are other accidents and complications of labor not included in the above table which would, from these causes, raise the normal still-birth ratio, under skilled professional care, to above two per cent. of the labors.

There is nothing remarkable in the fact of great variance of individual experience in these cases. Even in the tables of statistics from which the ratio of these complications are estimated, the experience of individuals with large numbers of cases of labor varies with wide limits in regard to the numbers of such complications met with, in some cases presenting more than 100 per cent. of difference, and not only individuals but also institutions. In exemplifying this we may compare, in some particulars, with Churchill's statistics those of Queen Charlotte's Lying-in Hospital from 1828 to to 1860, thirty-six years, as communicated by Dr. George B. Brodie to the Royal Medico-Chirurgical Society.* In 7736 patients producing 7824 births (86 being multiple births) there were but 22 cases of prolapse of funis, or 1 in 355; Churchill giving the ratio as 1 in 218. Of the 22 children, 14 were dead; Churchill's proportion, or more than 1 in 2.

Breech presentations not materially varying, Brodie, 1 in 56⅓; Churchill, 1 in 59½.

Lower extremities, Brodie, 1 in 159; Churchill, 1 in 108.

Upper extremities, Brodie, 1 in 372½; Churchill, 1 in 234¾.

Face, Brodie, 1 in 514; Churchill, 1 in 223½, or somewhat less than half as often for the former.

Placenta prævia, Brodie, 1 in 1956; Churchill, all hemorrhages, 1 in 122.

Brodie, craniotomy 21, or 1 in 368 labors, and forceps 49, or 1 in 154; or 1 crani-

* *Medical Times and Gazette*, May 28th, 1884.

otomy to 2½ forceps. The number of still-births not given except in the 22 cases of prolapsus of funis and the craniotomies.

Again, another illustration as regards face presentations: Dr. Spaeth met with but 7 in 14,424 deliveries,* or 1 in over 2000, and of these three only were saved, or a mortality of 57 per cent. of the children. And Dr. Von Helley,† in the Prague Hospital, of 58 cases saved only 18.19 per cent. of the children, a mortality of 81.81 per cent., which would indicate Churchill's ratio of 1 still-birth in 7 cases as being sufficiently favorable.

And again, as showing the substantial agreement of ratios deduced from very large numbers, with, at the same time, great diversities in parts, I will cite the statistics of Von Siebold ‡ in regard to twin births. He quotes from Veit's statistics, giving the proportion in Prussia as 1 in 89; Wirtemburg, 1 in 86; Saxony, 1 in 98. Also, as stated by Kirschner, the statistics of fifteen capitals of Europe and the States, varying from 1 in 57 in Dublin to 1 in 158 in Naples, but the majority running from 1 in 80 to 90, and the whole averaging about 1 in 90.

The whole number of births in Prussia from 1826 to 1834 is given as 4,520,085, with 52,384 twin births, or 1 in 86¼.

The whole number of births in the year 1840 is given as 580,747, with 6381 twin births, or 1 in 91.

These statements will show that the tables we have chosen from which to estimate the rate of occurrence of some of the complications of labor dangerous to the child, and the ratio of still-births from them, are sufficiently accurate for that purpose.

Now, what computations of general still-birth ratio have we toward establishing the normal ratio, and with which to compare individual statistics?

Fred. W. Lourdes, M. R. C. S., in *Transactions* of Medical Society of London,§ states that continental statistics show a general average of rather less than 5 per cent. of still-births.

The following statistics are compiled by Wm. F. Murray and published in "Reference Handbook of Medical Sciences," 1884:—

STATISTICS OF STILL-BIRTHS—PER CENT. OF BIRTHS.

1869.

| | | | |
|---|---|---|---|
| Netherlands | 5.64 | Prussia | 4.33 |
| Belgium | 4.72 | Hanover | 4.30 |
| France | 4.63 | Bavaria | 3.94 |
| Saxony | 4.49 | Austria | 1.64 |
| Norway | 4.46 | Italy | 1.94 |

Average, 3.95.

1871.

| | | | |
|---|---|---|---|
| Prussia | 4.29 | Hanover | 4.22 |
| Sweden | 2.64 | Mechlenburg-Schwerin | 3.70 |
| Saxony | 4.43 | Schleswig and Holstein | 4.60 |

General average, 3.64.

1878.

| | | | |
|---|---|---|---|
| Brussels | 6.3 | Geneva | 4.8 |
| Marseilles | 7.6 | Alexandria | 4.6 |
| Naples | 5.9 | Moscow | 2.7 |
| Berlin | 3.9 | Havana | 4.2 |
| Dresden | 4.7 | Montreal | 3.0 |
| Vienna | 4.9 | | |

Average, 4.8.

* *American Journal Medical Sciences*, 1860, from *Vierteljahresschrift*, 1859. † Ibid.

‡ *American Journ. Med. Sciences*, Vol. 48, 1864, from *Monatsschrift fur Geburtskunde*, Bd. XIV.

§ *American Journal Medical Sciences*, July, 1873.

For the New England States of Connecticut, Massachusetts, Rhode Island and Vermont he gives 3 per cent. of all births, and for the following American cities for the year 1883, as follows :—

| | | | |
|---|---|---|---|
| Philadelphia | 4.8 | Brooklyn | 9.7 |
| Washington | 10.7 | Baltimore | 8.8 |
| Milwaukee | 5.6 | Boston | 4.5 |
| New Haven | 3.3 | Cincinnati | 5.1 |
| Mobile | 17.7 | Richmond | 8.4 |
| Concord | 3.3 | St. Louis | 8.0 |
| New York | 8.9 | | |

Average, 7.6.

He states the general average of continental districts to be 1 in 20, or 5 per cent., and that the report of the Dublin Lying-in Hospital gives a rate of 4 per cent. in country practice, and that Dr. Andrew Smith says 4.9 per cent.

From these statistics we may deduce the following conclusions: That the still-birth ratio is lower in the country than in cities, and as a corollary from this, that it averages less for the whole of the country than for its cities; that while for States and countries its average is under 4 per cent., coinciding closely with that given in the report of the Dublin Lying-in Hospital, viz.: a rate of 4 per cent. in country practice, for European cities it averages near to 5 per cent., and in American cities is over 7 per cent., ranging from 3.3 per cent. in Concord to 17.7 per cent. in Mobile.

There are two notable conclusions also shown by these statistics: first, the low ratio in the New England States, 3 per cent., in which States there is believed to be a low proportion of all births to population, and second, the very large proportion, particularly in Southern cities; for example, St. Louis 8 per cent., Baltimore 8.8 per cent., Washington 10.7 per cent., Mobile 17.7 per cent. This excessive still-birth rate is said to be among the negro population, who are also very prolific, and among whom illegitimacy and syphilis are said to be very prevalent. We observe like causes producing like results in the large Northern cities in a lesser measure, with New York represented by a still-birth ratio of 8.9 per cent. and Brooklyn 9.6 per cent., and from same causes city populations in general exhibiting a higher ratio than rural districts.

Let us now see how individual reports of private practice, such as we find scattered through the journals, compare in their statistics of still-birth ratio with those based upon very large numbers.

Daniel Pierson, M. D., of Augusta, Ill., gives statistics * of 279 births in 274 labors (five cases of twins). Of these there were 19 dead, but among them he includes 7 cases of abortion and miscarriage before seventh month, which should be eliminated, leaving a proportion of 1 in $23\frac{2}{3}$, or about 4.4 per cent. There were, among these, 4 presentations of lower extremities, 1 of side, 3 of face and 2 of placenta. "Force delivery was used only three times, two of version for placenta prævia, and one case of craniotomy on a dead child." Two were already putrid when born.

R. Uvedale West, under title of "Statistical Study of Causes and Relative Proportion of Still-births in Private Country Practice," † gives the following statistics:—

In 2298 births (36 twins) there were 111 still-births, or 1 in 27, being 3.7 per cent. Of these, he states that 50 perished at birth, viz.: 8 cases of craniotomy, 7 cases of difficult delivery of head in footling births, 7 by prolapse of funis, 6 by severity of protracted labor left to natural efforts, 2 deaths from severe and protracted labor when instruments were used. The causes of death in the other cases not given in the abstract, nor the number and kinds of all complications.

Dr. H. Carson, in *Transactions* of Medical Society of State of New York,‡ gives

* *Am. Jour. of Med. Sciences*, July, 1873. † *London Lancet*, Nov. 12th, 1859.
‡ *Am. Jour. Med. Sciences*, June, 1864.

statistics of still-births, in 2389 cases of labor (39 twin births). In these there were 72 still-births, or 3 per cent.

W. H. H. Githens, M. D., reports to Obstetrical Society of Philadelphia* 616 consecutive cases of labor in private practice with result of no death of mother and only two still-born children, one of these destroyed by craniotomy. Forceps was used in two cases only. There was no case of twins. Two transverse presentations. One of hand and face combined. Three breech presentations. Placenta prævia present in two at term and in two miscarriages, one at 7 and one at 5 months. This report presents not only a remarkable variance from the normal ratio in some of the more dangerous complications to children, but also a remarkably favorable showing as regards those dangerous complications which were met with, and especially as regards absence of cases of ante-partum deaths of children.

Dr. Playfair makes reference to the success of Dr. Hamilton, of Falkirk, who, he says, had not had a case of still-birth in 751 consecutive cases of labor, his practice being to apply forceps in one out of 7 or 8 cases of labor, and not to permit any unnecessary prolongation of second stage. Notwithstanding Dr. Hamilton's remarkable success, as shown by this statement, yet it is apparent that his experience was exceptional in the entire absence of pre-natal deaths, and of the normal proportion of some of those complications as regards which his judicious practice of frequent use of forceps, so as to prevent any unnecessary delay in the second stage, could have exercised no influence on the infant mortality in such cases, though we have not the least doubt of his practice in that respect having saved many children, as probably also mothers, and certainly much unnecessary and prolonged suffering to the latter.

To these records I shall now add the statistics of my own experience in this respect in a small manufacturing town and private country practice; and presenting by no means as favorable a showing as the above records of private practice, but showing what none other of the records and statistics collected make to appear, the proportion of ante-partum deaths; these not in any way depending upon the accidents of labor.

Like Dr. Hamilton and the common practice of many physicians at this day, I have made frequent use of the forceps, and for the same purpose, not to permit any unnecessary prolongation of the second stage; and with much saving of life to children and of suffering to mothers. In a total of 1675 labors at or near full term, with 1692 children (17 cases of twins), the record presents a total of 75 still-births, or about 1 in 22½, or a little less than 4.5 per cent.; approaching that given by Dr. Lourdes to the Obstetrical Society of London, as the rate of still-births from continental statistics, viz.: a little less than five per cent., and very near that of Dr. Daniel Pierson, of Illinois, viz.: 1 in about 22⅔, or about 4.4 per cent.

Of these 75 still-births there were showing commencing decomposition and putridity, either from syphilitic infection of parent, or from pre-partum hemorrhage, or from degenerative changes in placenta, or from anæmia of mother, or from mechanical violence to mother, 11 cases. There were also born of mothers who had habitually and repeatedly before or afterward given birth to dead children, but not putrid or decomposing, 5 more, making together 16, or more than 21 per cent. of the whole number.

There were, again, those known to be dead when called in, from prolapsus of funis and other complications, or from difficult and retarded labor under care of women, 9 cases, which, added to the previously enumerated 16 made 25, or 33⅓ per cent. of the whole number. Were these eliminated from my statistics the result would show about 3 per cent. of still-births, comparing with some of the more favorable statistics from private practice. Deducting from the whole number the putrid fœtuses and those born of mothers habitually giving birth to dead children, 16, leaves 59 to be accounted for.

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* *Jour. of Am. Med. Assn.*, Feb. 5th, 1887.

The largest number of these occurred in cases of version for mal-presentations, there having been 14 still-births in 24 versions. These numbers present not only a much larger ratio of such cases to the whole number of labors, but also a larger ratio of still-births; the ratio in cases being about 1 to $70\frac{1}{2}$, normal being accounted as 1 to $234\frac{3}{4}$; and ratio of still-births being 1 to $1\frac{5}{7}$; normal accounted as 1 to 2. This excess of still-births in cases of version for mal-presentations in country practice, over that of hospital or ordinary city practice, may well be accounted for by reason of long distances from physicians in many cases, and consequent delayed assistance.

These cases represent nearly 24 per cent. of the 59. In the single births there were 23 breech presentations, or 1 to nearly 73 labors, a slight excess over the estimated normal ratio of 1 to 85; and among these were 7 still-births, or 1 to $3\frac{2}{7}$, a close approximation to estimated normal ratio of 1 to $3\frac{1}{2}$.

There were presentations of inferior extremities in single births 6, or 1 in 279, and no still-born among these.

Of face presentations 11, or 1 in 152 births, and among them 3 still-born or, 1 in $3\frac{2}{3}$ (normal ratio is estimated as 1 in 7). In many of these cases, as is usually the case, there were other complications embarrassing the labor and jeopardizing the child.

There were 17 twin labors, or 1 in about $98\frac{1}{2}$, a proportion slightly less than normal. Of the 34 children there were presenting by breech and inferior extremities 17, or 50 per cent., of which 3 were still-born, one of these being lost by reason of delivery retarded by interlocked or keyed heads, the other one living. These 17, added to 23 breech and 6 lower extremity presentations among single births, make a total of 46 such presentations, with 10 still-births, or 1 in $4\frac{6}{10}$. In 15 cases of simple prolapse of funis, with otherwise normal presentations, there were 7 still-births, about the normal ratio. There were in all 25 cases presenting prolapse of funis, or about 1 to $69\frac{2}{3}$ labors, the average being estimated at 1 to 83; but 10 of these were complicated with other mal-presentations, as transverse and placental, and the mortality of these is enumerated under those complications. Of placenta prævia there were 8 cases, 1 to 209 labors, and 7 still-births, which is believed to be about an average mortality in this class.

There were 3 craniotomies, 1 to 558 labors. In puerperal eclampsia 5 children were lost. Some of these cases had other complications which would have caused the loss of the child, but these are not elsewhere enumerated.

Strangulation by circumvolutions of funis about the child's neck, and a thereby retarded labor from the thus accidentally shortened cord, was certainly the cause of two still-births.

Premature separation of placenta by means of too short a funis was the cause of three still-births.

Both these last heads may be classified under still-births from shortness of umbilical cord, either accidental or absolute.

It appears from the foregoing statistics that the ratio of still-births to labors corresponds closely with that given by Dr. Lourdes as the ratio deduced from continental statistics on a large scale, viz.: a little less than 5 per cent., and approximates also that of Dr. Pierson of Illinois, viz.: 4.4 per cent.

Assuming 4.5 per cent. to be the normal ratio from all causes, and that my statistics also approximately represent the normal ratio from special causes, then we may conclude that in each thousand births there will be 45 still-born children, and of each hundred still-born children there would be, from special causes enumerated in the following table, the numbers respectively under head of percentage and opposite the given cause or complication.

RECAPITULATION.

| | No. | Per cent. |
|---|---|---|
| Putrid fœtuses | 11 | 14.66 |
| Children of mothers habitually giving birth to dead children | 5 | 6.67 |
| Transverse presentations.....children dead | 14 | 18.67 |
| Breech presentations..... " " | 7 | 9.34 |
| Inferior extremities..... " " | 0 | 0.00 |
| Face..... " " | 3 | 4.00 |
| Twins not otherwise classified.... " " | 3 | 4.00 |
| Prolapse of funis..... " " | 7 | 9.33 |
| Placenta prævia..... " " | 7 | 9.34 |
| Craniotomies..... " " | 3 | 4.00 |
| Puerperal eclampsia..... " " | 5 | 6.66 |
| Strangulated by funis..... " " | 2 | 2.67 |
| Premature separation of placenta " " | 3 | 4.00 |
| Unclassified..... " " | 5 | 6.66 |
| Total | 75 | 100.00 |

The five unclassified cases may very properly be charged to prolonged delay in sending for and to late assistance rendered in prolonged and difficult labors, under care of ignorant and incompetent women attendants, which is also the case in very many of the labors with complications fatal to the children.

Of the whole number of still-births, 22 were delivered by forceps, making about 1 still-birth to every 9 forceps deliveries, the whole number of forceps deliveries having been 194, or 1 to 8.6 labors.

Of these twenty-two forceps deliveries of still-born children, in all but three the fatality is accounted for by the complication of labor, or other circumstances which made the use of the forceps advisable. Some of the putrid children were so delivered, some of those known to be already dead when called in, but the protracted labor calling for speedy relief of the parturient; and in some cases of breech and transverse presentations, the forceps were applied to the after-coming head, also in cases of prolapsed funis, placenta prævia, in eclampsia, and twice in moribund women.

For specific details of the causes of the child's death, I will insert the following table, from a paper by myself, "An Analysis of One Hundred and Eighty-nine Instrumental Obstetric Cases," from the American *Lancet* of April, 1886:—

| | |
|---|---|
| Placenta prævia | 1 |
| Eclampsia | 3 |
| Moribund when called, one of consumption, one of hemorrhage | 2 |
| Probably specific disease, both cases in same woman | 2 |
| Face presentations and delay in one | 2 |
| Breech presentations and forceps to after-coming head | 1 |
| Uræmia of mother, child putrid | 1 |
| Excessive size of child | 1 |
| Prolonged delay in sending for aid, without other obvious cause | 5 |
| Leaving, as resulting fatally to children, without particular obvious cause | 3 |
| Combined hip and head, and forceps to after-coming head | 1 |
| Total | 22 |

## DISCUSSION.

Dr. E. Lester, Seneca Falls, N. Y., remarked that after a woman had taken chloroform and ergot, and had been delivered with forceps, the chances for a still-born child were fair. He believed in more conservatism, and did not use ergot in labor, and thought resorting to the forceps in the second stage, or using them too freely, was to be avoided.

He stated that, in a practice of twenty-two years, and having attended the usual number of cases a general practitioner would have during that time, between seven

hundred and eight hundred, he had used the forceps but eight times, chiefly in cases of eclampsia.

There is a large army of specialists following after us, and the poor woman has to suffer the cutting and carving if we do not do our work well. Wait and let nature do her work.

Dr. Geo. B. Dunmire, Philadelphia, Pa., asked Dr. E. B. Christian whether he could, after preparing his valuble paper, give any idea of the proportion of cases of still-born children caused by the use of ergot.

He said that for some time past he had been interested in the question, and expected, in the near future, to make known his conclusions. But he wished to say now that he very much feared that the indiscriminate use of ergot by persons who were totally ignorant of its physiological action, as well as its frequent use by intelligent physicians, was an important factor in the production of the large number of still-births.

He also stated that he was opposed to the use of ergot in the first and second stages of labor, and rarely then.

Dr. Enoch Pearce, Steubenville, Ohio, called attention to the relation of the early use of ergot by the profession, and especially by midwives, and stated that the result of his observation, in a practice extending over a quarter of a century, in a city of 15,000 inhabitants, led him to believe that the improper administration of ergot in its various forms has been, and is now, the most prolific cause of still-born children.

Dr. Sale, of Mississippi, mentioned the fact that ergot was often given with criminal intent on the part of midwives who were acquainted with its effect in producing still-births. He accounted for the percentage of still-births being greater in Mobile, as was reported by Dr. Christian, as being due, 1st, to the profession of said city being very honest in reporting their unfavorable cases, and, 2d, to the fact that many of these cases occurred in the practice of ignorant midwives.

Dr. J. H. Carstens, Detroit, Mich.—The use of ergot and delay in the skillful use of forceps, I consider the chief avoidable causes of still-born children. The unavoidable it is not necessary to consider.

Dr. W. L. Robinson, Danville, Va.—I have not, in my recollection, had a still-born child in fifteen years, and have not given a dose of ergot before delivery of child in this time. In inertia of womb, I have used electricity. In reply to the charge of large mortality in still-births in Mobile, I would say that ignorant midwives and imperfect statistics are the causes.

## MINUTES.

During the morning session two hundred and seventy-five members were present; during the afternoon, three hundred and seventeen.

It was announced at the morning session, that the President of the Section had been summoned to Chicago by the sudden death of his grandson.

Professor Simpson was called to the Chair.

The following resolution was then offered:—

The members of the Ninth International Medical Congress attending the meeting of the Obstetrical Section, having greatly appreciated the distinguished ability and

courteous grace whith wich Professor De Laskie Miller has presided over their Section, deeply regret his inability to continue his occupancy of the Chair.

They sympathize profoundly with their friend and President, in the sudden and sad bereavement which necessitated his return home before the close of the Congress, and request the Secretary to convey to Professor Miller the earnest expression of their sincere and brotherly sympathy with him in his great sorrow.

It was moved by Professor W. S. Stewart, of Philadelphia, and seconded by Professor A. F. A. King, of Washington, and heartily agreed to by the Section, to adopt the resolution expressed above.

Adjourned at six o'clock.

# FIFTH DAY.

FRIDAY, September 9th.

Professor A. R. Simpson in the Chair. The following was read:—

## REPORT ON UNIFORMITY IN OBSTETRICAL NOMENCLATURE.

### RAPPORT SUR L'UNIFORMITÉ DANS LA NOMENCLATURE OBSTÉTRIQUE.

### BERICHT ÜBER ÜBEREINSTIMMUNG IN DER GEBURTSHÜLFLICHEN NOMENCLATUR.

The Committee appointed to formulate resolutions in regard to Uniformity in Obstetrical Nomenclature beg to submit the following to the decision of the Section on Obstetrics of the Ninth International Medical Congress:—

*A.* It is desirable to try to attain to uniformity in obstetrical nomenclature.

*B.* It is possible to arrive at uniformity of expression in regard to—

I. The Pelvic Diameters;
II. The Diameters of the Fœtal Head;
III. The Presentations of the Fœtus;
IV. The Positions of the Fœtus;
V. The Stages of Labor;
VI. The Factors of Labor.

*C.* The following definitions and designations are worthy of general adoption by obstetric teachers and authors:—

I. PELVIC BRIM DIAMETERS.

1. Antero-Posterior:—

1st. Between the middle of the sacral promontory and the point in the upper border of the symphysis pubis crossed by the *linea terminalis* = *Diameter Conjugata vera*, Cv.

2d. Between the middle of the promontory of the sacrum and the lower border of the symphysis pubis = *Diameter Conjugata diagonalis*, Cd.

2. Transverse:—

Between the most distant points in the right and left ileo-pectineal lines = *Diameter Transversa*, T.

3. First Oblique:—

Between right sacro-iliac synchondrosis and left pectineal eminence = *Diameter Diagonalis Dextra*, D. D.

4. Second Oblique:—

Between left sacro-iliac synchondrosis and right pectineal eminence = *Diameter Diagonalis Læva*, D. L.

II. FŒTAL HEAD DIAMETERS.

1. From the tip of the occipital bone to the centre of the lower margin of the chin = *Diameter Occipito-Mentalis*, O. M.

2. From the occipital protuberance to the root of the nose = *Diameter Occipito-Frontalis*, O. F.

3. From the point of union of the neck and occiput to the centre of the anterior fontanelle = *Diameter sub-Occipito-Bregmatica*, S. O. B.

4. Between the two parietal protuberances = *Diameter Bi-Parietalis*, Bi-P.

5. Between the two lower extremities of the coronal suture = *Diameter Bi-Temporalis*, Bi-T.

### III. PRESENTATION OR LIE OF THE FŒTUS.

The *Presenting Part* is the part which is touched by the finger through the vaginal canal, or which, during labor, is bounded by the girdle of resistance.

The *Occiput* is the portion of the head lying behind the posterior fontanelle.

The *Sinciput* is the portion of the head lying in front of the *bregma* (or anterior fontanelle).

The *Vertex* is the portion of the head lying between the fontanelles and extending laterally to the parietal protuberances.

Three groups of Presentations are to be recognized, two of which have the long axis of the Fœtus in correspondence with the long axis of the Uterus, while in the third the long axis of the Fœtus is more oblique or transverse to the Uterine axis.

1. Longitudinal.
   (1) Cephalic, including—
      Vertex and its modifications.
      Face and its modifications.
   (2) Pelvic, including—
      Breech.
      Feet.
2. Transverse or Trunk, including Shoulder, or Arm and other rarer presentations.

### IV. POSITIONS OF THE FŒTUS.

The positions of the Fœtus are best named topographically, according as the denominator looks—*first*, to the left or the right side, and *second*, anteriorly or posteriorly. When initial letters are employed it is desirable to use the initials of the Latin words.

In the case of Vertex positions we have—

Left Occipito-Anterior = *Occipito-Læva-Anterior*. O. L. A.
Left Occipito-Posterior *Occipito-Læva-Posterior*. O. L. P.
Right Occipito-Posterior = *Occipito-Dextra-Posterior*. O. D. P.
Right Occipito-Anterior = *Occipito-Dextra-Anterior*. O. D. A.

The Face positions are:—

Right Mento-Posterior = *Mento-Dextra-Posterior*. M. D. P.
Right Mento-Anterior = *Mento-Dextra-Anterior*. M. D. A.
Left Mento-Anterior = *Mento-Læva-Anterior*. M. L. A.
Left Mento-Posterior = *Mento-Læva-Posterior*. M. L. P.

The Pelvic positions are:—

Left Sacro-Anterior = *Sacro-Læva-Anterior*. S. L. A.
Left Sacro-Posterior = *Sacro-Læva-Posterior*. S. L. P.
Right Sacro-Posterior = *Sacro-Dextra-Posterior*. S. D. P.
Right Sacro-Anterior = *Sacro-Dextra-Anterior*. S. D. A.

The Shoulder Presentations are:—

* Left Scapula-Anterior = *Scapula-Læva-Anterior*. Sc. L. A.
* Left Scapula-Posterior = *Scapula-Læva-Posterior*. Sc. L. P.
* Right Scapula-Posterior = *Scapula-Dextra-Posterior*. Sc. D. P.
* Right Scapula-Anterior = *Scapula-Dextra-Anterior*. Sc. D. A.

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* Left and Right refer, in this section, in all positions, to the left and right side of the mother, without regard to that side of the child.

V. THE STAGES OF LABOR.

Labor is divisible into three stages.

1. First stage—from the commencement of regular pains till complete dilatation of the os externum = *Stage of Effacement and Dilatation.*

2. Second stage—from dilatation of os externum till complete extrusion of child = *Stage of Expulsion.*

3. Third stage—from expulsion of child to complete extrusion of placenta and membranes = *Stage of the After-birth.*

VI. THE FACTORS OF LABOR ARE—

1. The Powers.
2. The Passages.
3. The Passengers.

*D.* Copies of the above resolutions shall be sent, in the name of the Section on Obstetrics of the Ninth International Medical Congress, to the various teachers and writers on obstetrics of the different nationalities represented at this Congress.

(Signed) DE LASKIE MILLER, M. D.,
*President of the Section.*
A. F. A. KING, M. D.
WM. T. LUSK, M. D.
A. R. SIMPSON, M. D.

DISCUSSION.

Prof. WM. H. WATHEN, Louisville, Ky., said :—

MR. PRESIDENT : In moving the acceptance and the adoption of the Committee's report on Uniformity in Obstetrical Nomenclature, I deem it unnecessary to consume the valuable time of this Section in advocacy of the many advantages of such a system, as no intelligent writer or teacher in Obstetrics can fail to appreciate its superiority to the various and confusing methods now in use in the text-books of all countries. I am pleased that the terms have been latinized, as it removes an objection mentioned by Prof. Charpentier and myself when this matter was considered yesterday ; for there can be no perfect uniformity except by the universal adoption of a language not susceptible of change. But the suggestions in this report must be persistently urged upon the obstetrical writers and teachers of the world. Teachers would be pleased to have a uniform nomenclature, as it would simplify the teaching of obstetrics, and a refusal to recommend to their pupils text-books of authors who fail to appreciate this fact would furnish a solution to the whole question.

Prof. RODNEY GLISAN, Portland, Oregon—Mr. President and Members of the Obstetrical Section : Having seconded a resolution accepting and adopting the report of the Committee on Uniformity in Obstetrical Nomenclature, I beg leave to state that I have done so because it seems to me that in its present modified and improved form the report will come as near as possible to fulfilling the general desire for uniformity. Although I opposed a similar report made by a former committee, as presented early in the session by Prof. Simpson, it was not because of any serious objection to said report, but to the fact that from the noise and confusion existing in the room at the time of its presentation, it was evident that the Section could not take intelligent action upon it. Hence, I was pleased when a new committee was formed, including Prof. Simpson and some of our most eminent authors and teachers, to report at this morning's session. While the last committee has modified and simplified the former report, I am glad that it has maintained its main features,

which are the result of years of deep thought and intelligent work by our distinguished foreign brother, Prof. Simpson.

I hope that the resolution will meet with the unanimous support of this Section, and that it will be fully endorsed by the next International Medical Congress, to be held in Berlin.

Prof. JAMES C. CAMERON, Montreal, Quebec—I heartily endorse the scheme proposed by Professor Simpson, for I consider uniformity of nomenclature essential to successful teaching. I would suggest that teachers of obstetrics recommend to their students only those text-books which adopt the uniform system of nomenclature. Although the matter seems at present largely in the hands of the authors of text-books, I think that ultimately it rests in the hands of teachers, for I am sure that self interest will soon compel authors to meet the views of teachers.

Dr. GUSTAVUS ELIOT, New Haven, Conn.—As one of the younger members of the Section, I beg permission to express my personal satisfaction with the schedule proposed by Professor Simpson, and endorsed by the Committee, as well as the gratitude which all the younger members of the profession must feel toward Professor Simpson for his efforts to abolish the confusion of the text-books. The schedule receives my unqualified approbation, and will, I trust, be adopted unanimously.

Dr. LLOYD ROBERTS, Manchester, England, said that we were all very much indebted to Professor Simpson for the able and satisfactory manner in which he had presented this subject of the uniformity of obstetric nomenclature, and suggested that it would be well if an expression of opinion could go forth from this Congress strongly urging obstetricians generally to accept the nomenclature.

Prof. A. F. A. KING said: I believe the best thing we can do for the present is to adopt the report as it is now presented. It has been under consideration now for about six years, since the Committee was first appointed at the International Congress of 1881, in London.

I will say one thing more, viz.: that whatever good may come from this effort to simplify the study of obstetrics, will be largely or entirely due to the energy and industry of our distinguished chairman, Professor A. R. Simpson, with whom the effort to improve the nomenclature of obstetrics first originated, in 1881.

Dr. AUST. LAWRENCE, Bristol, England, and Dr. W. W. JAGGARD, Chicago, Ill., expressed themselves as favoring the acceptance and adoption of the report.

Dr. GEO. WHEELER JONES, Danville, Ill.—I rise to urge the adoption of this report. A committee of our most able men have given this matter careful consideration for six years. The necessity for a rigid rule of nomenclature in the instruction of the student is fully realized by every careful teacher. Variations of thought and specific views in theories of general importance give abundant range for varieties of expression by individual teachers.

I think we owe it to ourselves, to the eminent men whose report we are considering, and to the coming student, to fully endorse the report now before us, and recommend its general adoption. The terms are clear and precise, and thus, in simplifying obstetrical teaching, a true advance is made in our art.

Dr. A. MARTIN, Berlin, thought the acceptance and adoption of the report should be deferred until the meeting of the Congress in Berlin, in 1890.

The motion accepting and adopting the report of the Committee on Uniformity in Obstetrical Nomenclature was then unanimously carried.

# A RATIONAL METHOD OF RELIEVING ASPHYXIA IN THE NEWLY BORN INFANT.

## UNE MÉTHODE RATIONNELLE POUR SOULAGER L'ASPHYXIE CHEZ L'ENFANT NOUVEAU-NÉ.

## EINE RATIONELLE METHODE ZUR VERTREIBUNG DER ASPHYXIE IM NEUGEBORENEN KINDE.

BY SHELDON STRINGER, M. D.,

Of Brookville, Fla.

I desire to call the attention of the medical profession to a method of relief of asphyxia in newly born infants, which I do not think has yet been called to their notice.

I do not claim for this method, as is claimed in many others, that it is novel, unique, etc., but that it is based entirely upon chemical and philosophic principles, and like many other discoveries in our art, is the result of accidental discovery.

We know that in the asphyxiated infant, unless the blood becomes oxygenated very soon the child must die ; we know that from several causes the sensorium has become so deadened or blunted as not to respond to the irritation of the atmospheric air, the application of cold water or other methods of inducing respiration ; yet fœtal life still remains and would continue were it not that the placenta has become detached, and thereby respiration, or oxygenation of the blood through the medium of maternal circulation, cut off.

Now if we can maintain fœtal life by any method, until the sensorium could sufficiently recover to respond to the various excitants of respiration, we would in many instances save the life of the infant. How that is to be done is the object of this short essay, as well as to relate the circumstances which led to the discovery of this simple method.

A few years ago I was called to see a multipara, in labor, and was told that she was only in the fourth or fifth month of pregnancy. In a few hours she was delivered of a fœtus which I took to be about the age indicated. The fœtus, membranes and placenta were all delivered by the same effort. Nothing unusual having occurred the fœtus and envelopes were laid aside till my departure, when I had it placed in some cloths and rolled up to carry with me, for the purpose of saving it as a specimen; but it being late in the night I deposited it till morning, when I proceeded to examine it, and to my astonishment, found the fœtal circulation still going on, with pulse at wrist. This was perhaps three hours or more after birth. Here was a case of fœtal circulation, to my mind carried on by the aeration of the blood through the medium of the placenta exposed to the atmospheric air. In contemplation of this case it occurred to me that the information might be utilized in cases of asphyxia in newly born infants, and I resolved to try the first case. Some time elapsed before a case offered to put in practice what I thought to be an important discovery. At last a case occurred; a large and well-developed child, of white parentage, and in which the head had been moulded into cylindrical form by a narrow pelvis. The child had a livid hue and could not be induced by the usual methods to make any efforts at inspiration. The circulation was still going on with some vigor through the funis, but the dark hue of the surface indicated plainly that unless oxygenation of the blood could take place, death would soon follow. Already the pulsation in the cord had become feeble and was becoming more so rapidly. I immediately delivered the placenta, rapidly cleansed it of clots and exposed the maternal surface to the atmospheric air. In a very short time the pulsation was perceptibly increasing in force; the livid and death-like hue was being displaced by one of life and health and it required but a few moments for the restoration of sensi-

bility, when the process of respiration commenced. I feel sure that had the placenta remained in the os uteri or vagina, excluded as it was from the atmosphere, death from asphyxia would certainly have occurred to the child.

Several subsequent cases have proven to my mind that this simple and rational plan of restoration is preferable to all others. And why not? Does not the blood become rapidly oxygenated when exposed to the air, even in an open vessel? Have you not seen venous blood reddened in a few moments after exposure to atmospheric air? Then why not, when exposed to the air through the irregular surface of the placenta, where aeration had been going on from the time of the earliest distinct organization of the embryo.

I commend this method to the profession, and ask that it be tried where more cases present themselves than are met by provincial practitioners, when I am convinced it will be universally adopted.

Encouraged by the eloquent and forcible address of our president, Dr. Nathan R. Davis, who plainly intimated that the near future is full of wonderful discovery and advancement in our profession, I offer the following suggestions in connection with the method above spoken of in restoring asphyxiated infants.

If some ingenious contrivance could be arranged to keep the placenta, which during intra-uterine life has been the lungs, as it were, duly exposed to the atmosphere, and necessary warmth and moisture continued, I see no reason why fœtal life could not be maintained indefinitely, if some method could be arranged for its nourishment; and if nourishment has been transmitted by endosmosis or by absorption from the mother, I ask if such a process could not be continued in like manner through the medium of the placenta; and if, in this way, what has been done by art and science for lower orders of life could not be done for the human species?

In answer to the question, What can be the advantages of this "human incubator," if such an apparatus could be contrived? I will say that in many cases of abortion, especially those induced on account of deformities of the pelvis and other legitimate reasons, life of the fœtus could be sustained and probably reach that period in which the prehensile organs of the fœtus enable it to sustain itself with the usual nutriments.

With the rapid progress in science and the accomplishments of the arts, is it not probable that the future has in store the consummation of some method of carrying this theory into practice?

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## PUERPERAL ECLAMPSIA.

### ECLAMPSIE PUERPÉRALE.

### DIE PUERPERALE EKLAMPSIE.

BY IRA E. OATMAN, M.D.,

Of Sacramento, Cal.

The obscure pathogenesis and the large percentage of mortality in Puerperal Eclampsia have made its successful treatment a desideratum in medicine earnestly and devoutly sought by all enlightened nations. Itself being a symptom portentous of speedy death, it requires immediate relief, to secure time in which to use treatment

for the removal of the pathological conditions on which the convulsions depend. A remedial factor of the first importance is prophylaxis. The previous conditions and the prodromata are sufficiently manifest in most cases to foreshadow the outburst of the Eclampsia, which may occur at any time after about six and a half months, the susceptibility thereto increasing to the full term of gestation, the acme of which being at the time of delivery or just before, or just after, slowly decreasing in intensity for days and even weeks. Searching and skillful clinical observations, with analysis of the urine, will generally disclose some form of Bright's disease, and sooner or later, œdema. As labor approaches the prodromata of eclampsia appear: cephalalgia, tinnitus aurium, dizziness, dimness of vision and increased susceptibility of the motor nerves, by reflex action from hyperæmia of the brain, although it is said anæmia of the brain exists in some cases, as well as general anæmia. The poverty of the blood in such cases would probably derange the coördinate action of the motor nerves, by impairing the cerebral power at their origin. The prophylactic treatment for these conditions may be successful, by the use of saline laxatives, Bromide of Potassium, Chloral Hydrate, Hyoscyamus, Compound Spirits of Æther, and also the milder diuretics, as infusion of Triticum Repens and of Scoparius, Nitrous Æther, etc., with a protracted course of substantial tonics, as Quinine, Tincture of the Chloride of Iron and Valerianate of Zinc and of Iron. But as this paper is designed to treat eclampsia when fully developed, its limits do not necessarily include the ætiology, histological pathology, diagnosis, prognosis, or prophylaxis of the affection, nor the established and most popular treatment of the best authors. All these, with the recent discoveries in relation to them, are lucidly and ably described by recent authors. I only allude to the above conditions in so far as it may serve to elucidate the principles of my favorite treatment, which, so far as employed, has been uniformly and speedily successful, without detriment to the strength or rapid recovery of the patient. Except in women who had had puerperal eclampsia, in my experience, in private practice, I have had no warning of the approaching attack. The convulsions appear suddenly, with slight or no prodromata, and generally recur at regular intervals. There is, in most cases, great vascular and nervous tension, with cerebral hyperæmia, which, by pressure, and probably elevation of temperature, seem to so interfere with the coördinate action of the motor nerves, as to arouse the sensorium to vigorous efforts at adjustment, resulting in the clonic convulsions. The exciting cause at any stage of gestation may be excessive physical or mental exercise with, or less frequently without, labor pains. The bowels may be constipated and there may be retention of urine.

The stomach may be loaded with undigested sour ingesta. The obvious indications are, to deliver the fœtus as speedily as can be done with safety, and to control the convulsions and to relieve the stomach of its ingesta, the bladder of its urine and the rectum of its contents. These should receive attention in the following order, viz.: Produce moderate anæsthesia, which may be profound at delivery, if necessary to control the convulsions. This should be done with æther, by inhalation, if tolerated well, if not, by chloroform. Should the æther not produce emesis and there is obviously undigested food in the stomach, forty to sixty grains each of pure magnesia, to neutralize the irritating acidity of the ingesta, and of ipecac, to secure its expulsion, should be given once in thirty or forty minutes, until the stomach is free from its contents. The urine should be drawn with a catheter and the rectum emptied by large enemata of warm camphor water, repeated once in thirty minutes until the rectum is thoroughly emptied. A moderate degree of anæsthesia should be maintained, sufficient to control the convulsions. If the os uteri be sufficiently relaxed and dilatable at any stage of the case, the fœtus should be delivered by turning or by the forceps, as rapidly as the safety of the patient or the fœtus will admit. The anæsthesia should be sufficient to make the patient wholly unconscious when delivered. If the os uteri is

not sufficiently relaxed, the anæsthesia being complete, it should be dilated with the fingers, or with artificial dilators, to secure the earliest safe delivery. After delivery, if the convulsions continue, as they have done in my practice, though at first temporarily modified in intensity, and the vascular and nervous tension continue, though they may be temporarily controlled by anæsthetics, formerly by venesection, the convulsions are liable to continue on to a fatal termination. But we now have a remedy which may be used at any time in the case, which is safe, speedy, reliable and permanent in its action. That remedy is veratrum viride. It may be used by the stomach, but it acts speedily in the rectum. Used hypodermically, its excessive action would be less under control. It should be given in doses of eight drops of the saturated tincture by the mouth or fifteen drops per rectum, and, if the convulsions are frequent or severe, six drops by the mouth, or ten drops per rectum, may be repeated once in fifteen or twenty minutes, until the convulsions cease. Two of the above doses may be sufficient. Should too much be given and the pulse be reduced below forty per minute, especially if emesis be frequent, alcoholic stimulants quickly and certainly relieve the excessive depression of the circulation. I prefer whisky or brandy, in form of a strong toddy, or if there has been much hemorrhage, milk punch repeated every fifteen minutes or oftener, if the patient vomit the last dose. A safe guide in urgent cases is, to give the stimulant after each vomiting, which is sometimes after each breath or second breath. The whisky or brandy may be given in a little water, which may be sweetened. Should there be coldness and pallor of the surface, the toddy should be given warm. In urgent cases of eclampsia, it is better to give the veratrum in excessive doses than to risk the continuance of the convulsions, for the excessive action of the drug is under speedy and absolute control. I have verified, in different cases, the fact that 120 drops of the saturated tincture at one time to an adult, or 52 drops taken by a child three or four years old (in both cases by mistake) is not dangerous to life under the stimulating treatment above described, and one case with a fluidrachm dose took no antidote. The vomiting was terrific. Now this treatment by veratrum viride has these advantages over any other treatment, viz.: It speedily relieves the eclampsia, by its absolute control over the vascular and nervous tension, and secures a greater and more satisfactory degree of general relaxation than can be safely done by venesection or any other means or medicine, while the greater relaxation it produces makes it more efficient in arresting the eclampsia, in that proportion. There is no loss of blood from its use, consequently no subsequent debility. The woman recovers under tonic and anodyne treatment almost as readily as if she had not had the convulsions. I have verified all the above statements in regard to the treatment in actual practice, which has brought me to the irresistible conclusion that, in puerperal eclampsia, veratrum viride exerts remedial action not otherwise attainable. After the eclampsia is controlled, the above preventive treatment against its recurrence should be continued, slowly decreased at discretion, until there is no further apparent danger. The post-partum treatment may be as usual. Should there have been hemorrhage, causing debility, Tincture of the Chloride of Iron in thirty or forty-drop doses, three times a day, after nourishment, and three or four doses of quinine in four-grain doses, should be given daily, for ten or fifteen days, with anodynes if indicated. My experience in its use has established in me the irresistible conviction that, in the skillful employment of veratrum viride, with the judicious use of anodynes, as adjuvant, we have the long sought *desideratum* in the treatment of puerperal eclampsia. I have also verified, apparently, its equal utility in the treatment of eclampsia of infants and children; and also of the violent epileptiform convulsions the result of reflex nervous action from diseases and displacements of the uterus.

DISCUSSION.

Prof. SIMPSON had listened with much interest to Dr. Oatman's paper. Cases of puerperal eclampsia were among the most serious that occurred in our practice, and any suggestion that promised to enable us to treat them with success was to be received with the utmost attention. Some five and twenty or thirty years ago, when he (Prof. Simpson) was an assistant to Sir James Simpson, he had to watch a fever patient on whom an American physician had persuaded Sir James to try the effect of veratrum viride, and in that case such dangerously depressing symptoms developed themselves, that he had ever shrunk from the administration of that drug. He had, of course, read papers in which its employment had been recommended, but felt more impressed now, from Dr. Oatman's testimony of its value, and would be interested to hear further the experience of his American colleagues in the use of veratrum in eclampsia or other cases.

Prof. DUNCAN C. MACCALLUM, Montreal—Different remedies have been lauded at different times, for the treatment of puerperal eclampsia, but, in my opinion, judging from my own experience, cases of eclampsia cannot be treated successfully in a merely routine manner. Each case must be treated on its individual merits, and not simply because it is a case of convulsions. In fourteen consecutive cases which have occurred in my practice during the last twenty-five years (eleven in hospital and three in private practice), the treatment has been uniformly successful, and yet they have not all been treated in the same manner. The cause of the disease, the condition and constitution of the patient and the stage of labor, have always been taken into consideration in the determination of the question of treatment. To produce and maintain narcosis, I have given hydrate of chloral and bromide of potassium in alternate doses, the former in twenty-grain doses every fourth hour, and the latter in thirty-grain doses every second hour. Chloroform has been administered during the labor, but suspended as soon as the child was born. Bleeding from the arm, an old and still a valuable remedy in suitable cases, the cases which Murphy has described as sthenic or apoplectic convulsions, I have employed in three cases. In one case where chloral appeared to have an injurious effect, I succeeded by hypodermic injections of morphia. The intestines being always loaded with dark, offensive matter, their evacuation has been secured by the administration of an active purgative, either by the mouth or rectum. Ice, in some cases, was placed to the head. I strongly concur in the opinion expressed by a previous speaker, that when vomiting is present and stimulants are indicated, they are better exhibited hypodermically than by the mouth. My chief object in making these remarks has been to direct the attention of the Section strongly to the fact that eclampsia should not be treated as an entity in which the conditions are always the same, but as a disease occurring under widely varying conditions which confer an individuality on each case. In other words, the physician should treat the patient, and not the name of the disease.

Dr. TANEYHILL G. LANE, of Baltimore, Md., endorsed the use of veratrum in eclampsia. One-half of his cases had been relieved by it, using ten drops of the tincture by hypodermic injection every hour. If the pulse went to forty-two, brandy was used. He referred to Dr. Latimer, of Baltimore, as having used veratrum when he (Dr. Lane) only temporarily succeeded with chloroform.

Dr. ENOCH PEARCE, Steubenville, Ohio, spoke of, in his judgment, the absurdity of attempting to lay down any line of treatment of eclampsia as a whole, and said: It is just as impossible as it would be to speak of scarlatina including scarlatina sim-

plex, scarlatina anginosa and scarlatina maligna, and set up any line of treatment for all these forms.

That eclampsia may occur in very different temperaments, in very different conditions of general health and at different stages of labor; may occur in a primipara of plethoric habit, with a contracted, rigid and unyielding os, where delivery is difficult and likely to be protracted, notwithstanding any means that may be used to effect delivery, and in some such cases perhaps, brain lesions, as extravasation of blood in or upon the brain, resulting in a true apoplectic condition, as evidenced by dilatation of pupil, one perhaps much larger than the other; perhaps attended by partial paralysis of one or both sides with stertorous respiration; said condition remaining after delivery, if it has been effected. Again, eclampsia may and does occur in the midst of an otherwise normal labor, where labor has progressed favorably up to that time, and where by forceps, or other rational means of relief, delivery is soon effected, and afterward, by care with anodynes and other therapeutic agents, complete recovery takes place within a few hours or days. In such cases as first named, venesection at the arm, or leeching temples, may be, and sometimes is, the sheet anchor of treatment, to be supplemented with narcotics and antispasmodics, with appropriate aids to delivery. The condition of eclampsia seeming to be dependent on a peculiar nervous condition resulting in the spasms of eclampsia; said condition disappearing, partly due to medication, but chiefly owing to the complete delivery, the termination of the parturition, which had been the chief exciting cause.

In short, different typical cases of eclampsia, each representing somewhat and often opposite general conditions and pathological states, are pathologically and therapeutically laws unto themselves as to prognosis and treatment; no one line of treatment being indicated, or practically successful in all cases; a large number of the formidable cases, pathologically considered, dying under all modes of treatment thus far resorted to.

Dr. Aust.-Lawrence, Bristol, England, expressed his surprise that so many had mentioned large numbers of cases without death. He has not been so fortunate, as most of the cases he saw were in consultation and not seen early. He stated each case must be treated on its own merits; he did not believe in any one plan. Chloral and early delivery were important.

Prof. A. F. A. King, Washington, D. C.—Since the discussion has taken so wide a range, embracing the ætiology and pathology as well as treatment of eclampsia, I must beg permission to present one or two remarks with relation to the former. Twenty years ago I suggested, theoretically, the use of veratrum, to lessen the force of the ventricular pump, inasmuch as I considered the spasms to arise from arterial hyperæmia of the brain, due to pressure of the gravid womb upon the aorta and its branches. During the spasms the brain became deluged with highly carbonized venous blood, which was nature's anæsthetic for diminishing the stimulus of red blood to the nerve centres. I have never used veratrum in eclampsia, but believe it to be a good remedy in proper cases. In apoplectic cases, accompanied with serous effusion, exhaustion of blood and consequent paralysis, the results would be far more serious and fatal than in epileptiform cases without this complicating accident.

I especially, however, desire to call attention to my recent publication upon the pathology of eclampsia, which some of the members present may not have read. And I would first venture to predict that none of the fourteen cases mentioned by Prof. MacCallum, of Montreal, were cases with shoulder or transverse presentation.

I would now ask the Professor if any of them *were* shoulder presentations? (Professor MacCallum, replied in the negative.) What I desire to call attention to is, that the main cause of eclampsia is premature descent of the lower segment of the womb, with its contained fœtal head, *below the pelvic brim*, two or three months before term, in primiparous women. Lusk, Barnes, Leishmann, Playfair, and most other late authorities, attest that it is usual and normal for the head so to descend in primiparæ. I maintain that this is *usual* (owing to corsets, etc.), but is *not* normal. On the contrary, the head should remain poised upon an iliac fossa in primiparæ, as it does in multiparæ. That is to say: the normal position of the fœtus during pregnancy, before the approach of labor, is *transverse* (or oblique). A head presentation before the approach of labor, in both primipara and multipara is abnormal, and in some cases causes such pressure upon the blood vessels of the pelvis as to produce eclampsia. I sincerely hope, and I must beg our distinguished member, Dr. Aust. Lawrence, of Bristol, England, and others, to try the method of preventing or relieving the eclampsia of the later months of pregnancy by posture—by placing the woman in the knee-elbow position, or the latero-prone position of Sims, and then by manipulation, external and internal, lift the womb *out of the pelvic cavity* and place it upon an iliac fossa, where it ought naturally to have remained until very near the end of pregnancy. So, I think, will the *cause* of the trouble be removed, the renal trouble relieved, and eclampsia prevented.

Dr. W. W. JAGGARD, Chicago, thought that the theory was well established that puerperal eclampsia was a symptom of urinæmia, conditioned upon functional or organic disease of the kidneys, or compression of the ureters. The immediate cause of the convulsions was vasomotor spasm of the arteries conveying blood to the brain. The indications for treatment were profound narcosis and the evacuation of the uterine contents at the earliest possible moment consistent with the safety of the mother. So long as the narcosis is profound and continued, the exact nature of the agents is not of great importance. Of course, chloroform, morphine, chloral and the bromides were the best.

An a priori argument in favor of veratrum viride in eclampsia, after the control of the convulsions, was derived from a consideration of its physiological action. Wood, of Philadelphia, had worked out the physiological action of American hellebore, and had showed that the drug is a powerful spinal and arterial depressant. Through its alkaloid, jervia, it produces more or less general vasomotor paralysis, according to the size of the dose. The patient was "literally bled into her own veins," to use one of Wood's happy expressions.

Dr. Jaggard thought that Dr. King was in error when he cited Lusk, Barnes, Playfair and Leishmann as attesting that it is usual and normal for the head to descend below the pelvic brim two or three months before term.

Dr. King's assertion that the normal position of the fœtus, during pregnancy, just before term, was oblique or transverse, he (Dr. Jaggard) was compelled to think most extraordinary. The alleged facts in Dr. King's paper were in many cases questionable, and his conclusions fallacious. Dr. Jaggard hoped no one would act upon Dr. King's suggestion of elevating the head to one of the iliac fossæ—if that were possible—in the entire absence of clinical evidence in favor of such a procedure.

Dr. GEORGE WHEELER JONES, Danville, Ill.—Mr. Chairman: Would it not be wise, before continuing this discussion, to inquire for a moment into the physiological action of veratrum viride? Its effect, primarily exerted upon the vasomotor nervous system, is a powerful heart depressant, with a tendency to general collapse in exces-

sive doses, being one of the most dangerous remedies in the materia medica. The entire alimentary canal is affected, as indicated by profuse diarrhœa, etc. We know that in the large majority of cases of eclampsia the disease is epileptic in character and reflex in origin. The late lamented Prof. J. S. Jewell, of Chicago, held to the opinion, and so expressed himself a short time before his death, that a very large proportion of epilepsies had their immediate exciting cause in a loaded condition of the descending colon and sigmoid flexure, and treatment based upon that view seemed to confirm his opinion, which being correct, would place all that class of cases of eclampsia in the list of diseases to be avoided. I know that, whereas I formerly had a good many such cases to complicate my practice, of late years I have had none, and believe it to be largely due to general care and prophylaxis, which every parturient woman should be entitled to receive for two to four weeks previous to confinement. Upon the slightest advent of nervous irritation I make it a rule to give chloroform at once, and freely, so long as it may be needed. I have given veratrum, but only in cases of high arterial tension, and with elevation of the temperature, where its action is prompt and efficient. It is one of the very best, if not the most reliable remedy we have in the convulsions of children, which are usually accompanied with febrile exaltation and cerebral congestion during the intervals. There are varieties and special cases of eclampsia which nothing will cure, they being surcharged with the elements of disorganization from the incipiency of the disease. The great majority will recover any way under soothing management, after the removal of the immediate exciting cause, which it is our duty to ascertain and accomplish at the earliest practicable moment. When our treatment is applied to the case in hand, without any resort to vaunted specifics, we will seldom lose a case.

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## THE MANAGEMENT OF PREGNANCY TOWARD THE PREVENTION OF POST-PARTUM HEMORRHAGE.

### TRAITEMENT DE LA GROSSESSE À SEULE FIN DE PRÉVENIR L'HÉMORRHAGIE APRÈS L'ACCOUCHEMENT.

### BEHANDLUNG DER SCHWANGERSCHAFT MIT HINSICHT AUF VERHÜTUNG DER BLUTUNGEN IN DER NACHGEBURTSPERIODE.

BY E. PAUL SALE, M. D.

Aberdeen, Miss.

Several years since an eminent American obstetrician enunciated the dictum "that the occurrence of post-partum hemorrhage was an evidence of mismanagement of labor on the part of the accoucheur," and still another asserts, "that there should, in fact, be no hemorrhage at all; even the loss of as much as two ounces of blood after delivery of the placenta should be regarded as pathological." Not being prepared to accept such extreme views, but sharing with them, to some degree, the same opinion, I, in common with most of the profession, recognize many pathological conditions, both local and constitutional, having a causal influence on this untoward occurrence, which probably had their origin in so remote a period of utero-gestation, or perchance, in the

pre-pregnant state, that the obstetrical attendant should in no wise be held responsible for its happening, provided his introduction to the case was near or at the advent of labor. It is these conditions which I now propose to discuss as well as I can, compatible with the limited time allowed.

I will commence by saying, that for many years I have held the opinion that the pregnant woman should be under supervision of her intended accoucheur from commencement to the end of her pregnancy, for, by the adoption of this plan, her attendant has the very great advantage of noting peculiarities of temperament, or any physical deviation from the norme; this is oftentimes the keystone to success in his future management of the case. In no conditions is it of more importance than those in which one would have reason to suspect the probable occurrence of post-partum hemorrhage.

The suspicion would be well grounded if we learn from a nulliparous patient that either parent had been of a hemorrhagic diathesis, and more especially if there had been a history of her mother having been a "free flower" during her menstruation and labors, or if fortuitously we should discover on the patient's person ecchymoses, and learn at the same time that such spots frequently appear from slight traumatism; if parous, we have to guide us, in addition to the above, an account of the patient's behavior in this regard in a previous labor or labors.

Among many predisposing causes for post-partum hemorrhage, we have, in their order of importance —

First. That inexplicable pathological condition known as "Hæmophilia," just alluded to, in which hemorrhage occurs from very slight causes, *e. g.*, extraction of a tooth, or profuse nasal hemorrhage from mere turgescence of the Schneiderian mucous membrane, or, as I once saw, an alarming hemorrhage proceeding from a diffused area of surface of the vagina in one of "Cressid's kind," after a sexual intercourse, in which no abrasion or granular vaginitis was discoverable, and I was further informed by the patient that this was the third occurrence of hemorrhage from the same cause, it having evidently been due to an intense degree of congestion of the vaginal mucous membrane. Strange to say, it was held at one time that hæmophilia did not increase the risk of post-partum hemorrhage, but investigations by the German pathologists, Borner and Kehrer, alluded to by Hartshorne, in Reynold's "System of Medicine," "have brought to light facts showing that very dangerous post-partum hemorrhages do occur in women with this diathesis, and that such a hereditary proclivity accounts for many deaths from uterine hemorrhage for which some other explanation had been accepted."

Second. We have anæmia or acquired hæmophilia or a general condition of spanæmia, being due to definite causes, such as malarial or syphilitic cachexia, saturnine or mercurial toxæmia, or the resultant of a recent attack of some acute infectious disease, *e. g.*, scarlet fever, or that ever fatal disease leucocythæmia; albuminuria and Addison's disease are also potent factors in causing this trouble.

Third. We have next in importance an atonic condition of the uterus, which is usually produced by too rapid child-bearing; also an inherent muscular debility resulting from having been too delicately nurtured; from diseases occurring during pregnancy, such as typhoid and yellow fevers; these produce fatty degeneration of the muscular layers of the uterus in common with all muscular tissue; acute fatty muscular infiltration, which often takes place from a peculiar derangement of digestion, or the sudden change from an active to a sedentary life. Again, a prominent cause for atony is a mechanical quasi paralysis from hydramnios, and the same conjoined with plural gestation.

Fourth. We can have a blending of the two causes just mentioned, in which these adventitious ones are engrafted on true hæmophilia.

Fifth. Traumatism, as a lacerated cervix and uterine cancer. The existence of fibromata might also be forced into this class. Unfortunately none of these causes offer a positive barrier to the prevention of conception.

Sixth. Intemperance—and distinctively among the class usually denominated "beer soakers."

Seventh. The influence of age, the danger increasing as age advances.

Eighth. Heart diseases—especially those forms in which there is hypertrophy of the left ventricle.

Ninth. Plethora—Upon the recognition of these several causes depends, of course, successful treatment of the conditions which are classed curable, and even in the non-curable ones, such as cancer, chronic kidney troubles, leucocythæmia, etc., much can be done toward lessening the risk of hemorrhage after labor.

In the interest of system and brevity, we might consider the therapeusis of some of these causes in their order as before mentioned, dwelling longer on those morbid conditions which are of most importance.

Commencing with hæmophilia, we are necessitated, in limine, to allude to one of the most rational theories of its pathology in order to appreciate in its relief the action of medicines, viz. : tenuity, to an abnormal degree, of the walls of the capillaries, and sparseness of muscular tissue in them, a condition acknowledged to be congenital and hereditary.

As no fault has been found with the chemistry of the blood, the indication for treatment therefor, according to my mind, should be the development or stimulating of what muscular tissue there is in the capillaries, and with this in view, I have pinned my faith, and I may say, in many instances, with satisfactory results, upon those stimulating oils, as oil of erigeron and turpentine, which are absorbed in the blood with but little chemical change, and during their circulation stimulate the arterioles, thereby producing contraction of whatever muscular tissue they may possess. Of the two mentioned, my own choice, from rather a full experience with this class of cases, is for oil of erigeron, the effect of which is more prolonged than turpentine ; it, furthermore, has the advantage over turpentine in not producing renal hyperæmia except in very large doses, consequently its use can be continued much longer. When either of these agents produce gastro-intestinal irritation, I use as next choice the liquid extract of matico, which, in effect, is but little inferior to the two drugs before mentioned.

To one who has not methodically and persistently tried these remedies in hæmophilia it will be surprising to note the positive benefit which may be obtained by them. The internal use of ferruginous astringents, ergot and digitalis, have, in my hands, proven of no avail. In anæmia or acquired hæmophilia, as the result of some special cachexia, the self-evident indication is to remove the cause.

In atony of the uterus, and I might as well add, atony of the abdominal muscles, for when the uterus is atonic, the abdominal muscles usually are, we have potent therapeutical factors, which are drugs classed as uterine tonics. These have not, I fear, had that importance given them by the profession which they deserve. Chief among them may be mentioned viscum flavescens, stylosanthis elatior, aletris farinosa, cimicifuga racemosa and salix nigra, the most eligible preparations of these being their liquid extract. Each one of them have their admirers, and no doubt all are good, but the one I give preference to, however, is stylosanthis, the dose of which in liquid extract is from five to fifteen minims, administered in some aromatic water after each meal, commencing its use about the middle of the seventh month of pregnancy. As adjuvant to these remedies, it has been my custom to faradize with a weak current the abdominal muscles, in a *seance* of ten minutes once daily, and without fear of producing premature labor. After applying electricity several times, the patient can easily be taught the working of the battery, and how to use it on herself.

By way of illustrating the benefit of treatment on an atonic uterus, I will ask this Section to bear with me while giving the history of rather an extreme case of this condition. Mrs. ——— æt., 33, parous, five children, had, in all except her first labor, flooded badly, and in her fifth to such an extent that she was saved only by heroic measures. My first acquaintance with her was as gynæcologist, two years after this last labor; she was then suffering from an endocervicitis, with quite a succulent uterus, and ligaments so relaxed that the womb amusingly reminded one of the drunken man on horseback, who, when propped up on one side, would fall over on the other. After a treatment of six months she conceived, and her family physician having had such an alarming experience with her in former labors, requested that I should take charge of her in this approaching accouchement, which I did, near to the expiration of the eighth month, and commenced the treatment by electricity and fluid extract of stylosanthis, changing this last after awhile to the salix nigra, so as to relieve her of the monotony of taking the same medicine so long. The first recognizable pains occurred at 8 P. M., the first stage terminated at 11 o'clock, the second at 12.20, and after waiting fifteen minutes, I partly expressed the placenta, which was delivered with a loss of not more than a drachm of blood, the most bloodless labor I ever saw; the uterus contracted well, and the lady made a speedy recovery, and has since enjoyed excellent health. If the pregnant woman has, perchance, gone through an attack of typhoid and yellow fevers without an abortion or miscarriage, we have reason to suspect fatty degeneration of uterine tissue, and an endeavor should be made to relieve this by measures addressed toward the improvement of her general health, and the intelligent, consequently cautious, use of faradization. Atony, due to bad hygiene or too sedentary a life, is best treated by calling the patient's attention to its prejudicial effect, and have her change to a judicious indulgence in open air exercise. When due to sudden accumulation of fat, as an error of digestion, this can be relieved by stomachic tonics, as quinine and strychnine in small doses, and increased oxidation of tissues by the use of iron, and remaining in the open air as much as possible.

Under the head of traumatism, from cancer or a previously lacerated cervix, I have no opinion founded on personal experience of the former, but should I ever encounter it I would be very much disposed to let it severely alone. In the latter, if it has been discovered before the expiration of the third month of pregnancy it should be operated on; after this period the tissues are in such a state of succulence and turgescence, that I doubt if union of the denuded surfaces could be obtained.

Those predisposed to hemorrhage by reason of intemperance, we should endeavor to rescue by moral measures, combined with the usual treatment for dipsomaniacs; but I wish those who may try it better success than I have obtained with this class. The influence of hypertrophy of the left ventricle of the heart in causing post-partum hemorrhage is confessedly a difficult task to annul, but I have suspected good results from the exhibition of gelseminum in the last month of pregnancy.

We now consider the last, which is plethora, and, fortunately, the result of treatment in this is highly satisfactory. It is only necessary merely to mention, for the relief of this, the advantage of dietetic management, combined with the careful use of saline laxatives.

## DISCUSSION.

Prof. SIMPSON remarked that the subject of post-partum hemorrhage was one of the highest interest, and in most of the communities in which the matter had been brought up for discussion it had been looked at from the point of view of its actual occurrence. Dr. Sale, however, had brought the subject forward from the very important point of view of the prophylaxis, by special management of the pregnant female who had shown special proclivity to bleeding. The various constitutional and

local changes that were likely to give rise to this unfortunate tendency had been very fully analyzed, and measures of treatment had been suggested by the author, that seemed to him (Prof. Simpson) to be very rational. Dr. Sale had made mention of some drugs the use of which had not yet become familiar, at least among British obstetricians, and it would add to the value of the paper if Dr. Sale could state more definitely the mode of action on which he placed so much reliance. The question of the causes and treatment of post-partum hemorrhage when it was actually in progress, was usually very fruitful of debate. This was not raised by Dr. Sale's excellent paper; but it would be of interest to hear what experience any of the obstetricians who were present might have had in the use of the agencies advocated by Dr. Sale.

Dr. H. B. Hemenway, Kalamazoo, Mich.—In my comparatively limited experience I have not been enabled to expect and diagnosticate post-partum hemorrhage more than a few hours previous to its occurrence. In my cases I have depended largely upon small doses of ergot. Having had most excellent results in passive congestion of the brain in the use of this drug, I have come to depend largely upon it in all relaxed conditions of the blood vessels, and non-striated muscles. I do not use large doses, fearing too great and powerful effect, or if I may be permitted to so call it, slow spasm of the uterine tissues. I well recognize also the danger of rigid os uteri as a result of over-use of ergot. I suspect that a late ligature of the cord, or only ligature of the fœtal end of the cord, tended to prevent post-partum hemorrhage. I have not sufficient data to warrant that definite conclusion, but I have for some time suspected it. My explanation is as follows:—

There is no direct communication between the maternal blood vessels and those of the placenta. When the cord is ligated late, or when only the fœtal end of the cord is ligated, blood escapes from the placenta, and that organ collapses. As it does so the edges are first detached from the womb, which contracts firmly over the placenta. When, however, the cord is ligated early the placenta is not emptied of blood and is hence rigid. The centre is then first detached, and between it and the uterine wall a sac is formed which fills with maternal blood. When the placenta is removed it is followed by the collected blood. The uterine vessels are not closed by muscular contraction but only, if closed at all, by clots of blood. These clots are sometimes easily dislodged, and when the full and hence large placenta is expelled, before the womb recovers from its surprise the mother's vital fluid again flows out.

Such a misfortune is assisted by the partial or complete paralysis of the uterine wall where the placenta has been detached.

I should like to know the results of the experience and observation of others with reference to the relation of late ligation of the cord to post-partum hemorrhage.

Dr. Enoch Pearce, Steubenville, Ohio, said, that while it was perhaps not pertinent to the discussion of this paper to go into a consideration of any means to be used during the conduct of the labor, yet, as the accoucheur is, as a general rule, not called until to attend the woman in labor, the most important means in practice are those which he may adopt during the progress of the labor, for the prevention of post-partum bleeding.

# DYSTOCIA FROM RIGIDITY OF THE OS UTERI AND ITS MANAGEMENT.

## DYSTOCIE PROVENANT DE LA RIGIDITÉ DE L'OS UTÉRIN ET SON TRAITEMENT.

## DYSTOKIE DURCH RIGIDITÄT DES MUTTERMUNDES UND IHRE BEHANDLUNG.

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I have selected the above for the topic of my paper because of its relative frequency, its dangers to the fœtus, and its intimate subsequent relations to the gynæcologist in the development of a fruitful field for brilliant operation, professional eclat, and financial success. The possible death of the fœtus, by the withdrawal of a normal stimulus, of course, increases the dystocia and the danger to the mother. It is with a hope of suggesting how a possible diminution of its unfortunate accompaniments, and of its dread sequelæ in the laceration of the cervix, may be obtained, that I appear before you.

Following the routine lead of the books, we have in dystocia three varieties of rigid cervix to consider—the anatomical, the pathological and the spasmodic; to the latter of which I wish to call especial attention during the few moments allotted me. The anatomical or mechanical rigidity of Pajot is met with usually in primiparæ, perhaps most frequently in premature labors, and is distinguishable by the obstinately undilatable condition of the entire neck for many hours, sometimes for days. The cervix gives the sensation to the touch of a mass of gutta percha, uninfluenced by any effort the uterus may make. I have found it in women who had the conical cervix before pregnancy, and in others where the cervix had been undersized and apparently immature. I have conceived the idea that the condition may be generally due to an excessive development of the transverse fibres at the expense of the longitudinal, or the faulty relative position of the two varieties of fibres, associated frequently with fatty degeneration, and I have seen cases where I was positive that an interstitial syphilitic taint, or a taint obtained from the father through the child, was at the base of the tissue change. The cervix is most like the neck of the earlier months, it is not sensitive, nor irritable, simply firm and inactive in its condition of partial dilatation. The treatment is very simple, and will be referred to later. The condition is not usually a serious one to either mother or child, unless exhaustion or undue irritation arises in the one case, or the amniotic liquor is discharged in the other, when the proper measures for expediting delivery should be inaugurated. Believing this to be due to a malnutrition or abnormal development, I have serious doubts as to the propriety of making it a distinctive variety, but should place it in the pathological list when the dystocia arises from the presence of induration, cicatrices, bands, tumors of various character, and cancers.

The diagnosis of this form of rigidity will consist in a careful appreciation of the special pathological condition existing, which is generally determined by a thorough examination, after which the usual measures proper in such derangement as may be found should be adopted. Simple induration might be difficult to diagnose from the anatomical variety, but as the treatment is identical, the lack of a positive diagnosis would involve no serious consequences. These various pathological conditions are usually found in multiparæ, and have their origin in the numberless causes which make toward departure from normal nutritive changes. Bad gynæcology has much to answer for in many cases, as the means often adopted for the cure of abrasions, erosions, inflammations and superficial ulcerations necessarily have an ultimate disastrous effect in the profound changes inaugurated in both the mucous tissue and the underlying fibrous mass, with its intimate network of blood vessels and nerves. The silver salt is an

especially unfortunate remedy in this respect. Excessive sexual irritation is also an unappreciated but prolific cause of many nutritive disturbances and serious pathological developments in the entire sexual system, including the sympathetic ganglia as well. Indeed, I have seriously considered the idea that not only many milder tumors and hypertrophic formations may thus arise, but that cancerous developments, to a very great degree, have their origin in the subtle changes in the nutritive processes brought about by over, abnormal, and irritative indulgence in the passions of the sexes. I am slowly gathering a mass of statistics upon this question, which I hope some day to lay before the profession, and I throw out this hint here, hoping to receive assistance from co-workers in the fields of labor.

Spasmodic rigidity of the os is placed the third, and to the practical accoucheur the most important, of the varieties to be considered. A labor may be progressing never more pleasantly when this accident will be suddenly developed. It occurs in all stages, but is of interest to this paper chiefly in the first. If the patient complains unexpectedly of nausea, cramps in the limbs, frequent vesical or rectal tenesmus, and the complaint arises, "Oh, doctor, I know I can't stand it," a careful examination should at once be made, when the vaginal outlet will generally be found freer from moisture than before, with a well-defined contraction of the sphincter; the lower uterine segment is generally reached, the vaginal canal is warmer, and the woman, either by word or action, rather objects to the introduction of the fingers, which should be done with the utmost caution and gentleness. The edge of the os is found to be sharply defined, thin, perhaps, as paper, and as tense as an unbroken hymen. During the interval between uterine contractions, this sharp tension of the os remains unrelaxed, and the usual fulling and softening of the neck does not occur. The whole cervix, but especially the external os, is tender and irritable, the patient often complaining that the slightest touch of the doctor is more painful than the uterine throes, often, indeed, attributing her suffering (sometimes with cause) to him, rather than the "pains," which generally become severe, as if to overcome the unexpected resistance at the outlet, although in many cases they are irregular or absent, or more or less uterine. If waters are undischarged the tumor of the membranes is full, firm and persistent, or, in some cases I have seen where the membranes are relaxed, and the uterine force has drawn the water to the lower segment, the feverish vagina may be filled with a soft sac of fluid which is grasped by the os, like a string around the mouth of a half-filled meal bag, and is utterly useless as a usual assistant at such times. If the liquor has been previously evacuated, as is very common, the cervix prevents the engagement of the head in the superior strait, or grasps the corrugated scalp with a vigor and determination to injury that demands prompt cessation of longitudinal effort if practicable. The cervical ring is generally, if not always, found more or less displaced, usually to the left or far back in Douglas' cul-de-sac, in which case the opposite side of the cervix, or the anterior lip, is greatly distended, thin, and stretched over the presenting surface of the fœtus until it may be extremely difficult to decide as to whether we have a rigid resistant os, or one fully dilated and retracted, with impacted fœtus, so intimately blended and closely applied are the thin, wiry edges and distended body of the cervix with the surfaces beneath. I know an error in such a case to be committed once, by a professional friend of large experience, and a most accomplished accoucheur, who was in haste, and after applying the forceps, produced such a dreadful transverse laceration of the cervix at the vaginal junction, that the woman died in a few moments.

Owing to reflex irritation the uterine contractions are not likely to be violent and persistent until the thinned fibres of the os give way, torn by their spasmodic and persistent contractions upon an irregular presenting surface, permitting the fœtus to advance, and often accomplishing a speedy delivery to a half asphyxiated child, or where the amniotic sac has been emptied, and the uterine struggles have been strong

and unintermitting for many hours, we have a still-birth with all its present and future concomitants. When the cervix gives way the laceration takes place at the point of greatest resistance, and may be manifest in all degrees, from the slightest abrasion to a rupture involving the lower segment of the body. Owing to the irregular surface of the presenting part after severe compression in the first position, and the usual impinging upon the left ilium, the greatest strain and the greatest liability to laceration occurs upon the left side of the cervix, and it is there that we find this result most frequently developed. The prominent symptoms which I have thus rapidly rehearsed are manifest in all degrees of severity, from a bare threat of physical disturbance in a hysterical girl, to the most violent of spasms, demanding treatment exceedingly urgent in character. In the one case we should be prepared to check the disorder; in the other to avert the danger. A sensitive cervix is a suspicious symptom, and so is a sensitive vulvar outlet; local cramping in the extremities should also demand immediate attention. The spasmodic action may have its origin in irritation at either os, in the reflex irritability and irregular contractions developed in the fundus by attachment of placenta, or local injury, or irritation caused by the movements of the fundus. The attachment of the placenta in one corner is very apt to develop trouble of this character. In cases of this kind I have noticed great tenderness and pain over regions of placental insertion. Sources of irritation in the sacral plexus, in the genito-urinary tract of the cord or in the organs with which these local nervous centres have their direct relation may easily start a train of phenomena which will develop a typical case. In cases of version and other operations this is one of the complications to especially guard against. Œdema of the anterior lip, with resulting depression, will occasionally develop this rigid os, and this is the only circumstance which might lead to a mistake, in the supposition that we had a case of anatomical rigidity. The diagnosis is in the fact that in the latter there is no tendency to the formation of the thin edge of the os during a pain, the neck is uniform in thickness of tissue, preserves its length, and has been free from tenderness and irritability.

In the treatment of the varieties, but especially of spasmodic rigidity, the accoucheur has often to exhibit a skill, a degree of wisdom and judgment, and a brilliancy of operation which is demanded in few of the emergencies of our art, and can be fully appreciated only by the most accomplished of our fellows. Having so wide a range of possible origin, knowledge and memory are often put to a severe test in clearly defining the particular direction from which the attack is being made, and our decision will often involve the question as to whether we will silence a masked battery, cut off the communication with the enemy, or become involved in the general battle. Recognizing the existence of the disorder, we are to diligently seek its cause, remove the same where practicable, and resort to such means as are proper and demanded to subdue complications and avert catastrophes. The so-called anatomical rigidity usually requires simple patience until such time as the distention of the cervix is fully accomplished, be it hours or days, remembering that, barring complications, the condition is not a serious one to the child, but only to the mother in its possible after effects. Should undue irritability arise opium will be found one of our most valuable remedies for calmative effects, especially its popular combination with ipecac, under the influence of which a few hours of quiet will be followed by a normal delivery. If indications of exhaustion appear, or the neck remains obstinately unaffected, Barnes' water bags, or Molesworth's dilators will be found the most efficient and available of all the other measures. Dilatation with the fingers is intensely annoying to the patient and productive of unpleasant nervous symptoms in many cases, and there is no metal dilator thus far devised which is uniform and physiological in its action, *i. e.*, operating smoothly and evenly upon all fibres alike and directing its force from within; the rubber bags, properly used, fill the indications precisely, and will not disappoint the prac-

titioner. Sitz baths and warm vaginal injections are always in order and excellent adjuvants. I also make it a point to deliver in a warm room, because of the beneficial effects upon the skin and peripheral nerves. Blood-letting was once recommended, but there is nothing in the pathological condition to prove that it is not unscientific. Chloral, both by stomach and rectum, has been advised, but, I believe, from theory alone. I enter a protest here against the use of chloral in obstetrics so long as the fœtus remains in placental connection with the mother. I have used it in a number of cases, and have always found it to so profoundly affect the child as to give rise to alarming symptoms. The remedy promptly passes into the circulation, and so benumbs reflex sensibility in the child as to interfere with the efficient use of the usnal means for resuscitation in compression and asphyxia from prolonged labor. I have abandoned it entirely in my own obstetric practice, and I am sure that it posesses no advantages or claims that could overcome my belief in its extreme noxiousness. Chloroform is harmlessness itself in comparison, under these circumstances.

In pathological rigidity, the course just laid down is the proper one, in combination with such special measures as each particular abnormal condition may demand. An obstinate os, a cystic growth, a cervical fibroid, an abscess, simple hypertrophy, vegetations and tumors, each will require its own special management, from the special incision of an abscess to an abdominal section. In the treatment of spasmodic rigidity we often have our judgment thoroughly tested in deciding upon the proper course to pursue; and while the life of the mother is not in danger, perhaps, there are years of suffering to be averted, and the life of a child is often at stake. Our first procedure is to carefully ascertain, where practicable, the immediate location of the primary spasm and remove the causes of irritation at that point; correcting the malposition of the fœtus by cautious bimanual manipulation, aided, perhaps, by the nates; correcting a misplaced uterus by changing the positions of the woman, or steadily holding the fundus in its proper place until the tendency to assume an abnormal position is overcome, and in this way, with rarest gentleness, relieving irregular contraction, may be all that is needed. The almost normal inclination of the fundus to the right, with an impinging of the external os against the left ilium, with the inner os or lower segment of the fundus compressed on the right side, is, perhaps, the most frequent cause of irregular action in the circular fibres to overcome, and the moment irregular contraction of any bundle of fibres is established, that moment all the phenomena of disorder are set in motion, until the entire cervix may be in a state of violent tenesmus, congestion and agony.

All efforts to change abnormal positions of fœtus or uterus or cervix must be of the gentlest character, remembering that one common cause of spasm in the cervix is excessive manual assiduity on the part of the accoucheur. After correcting malpositions, if the cervix is only slightly dilated and the pains are strong and persistent, a full dose of morphia and ipecac will almost certainly give happy results in soothing pain, calming nervousness and relieving congestions. While this is being accomplished, we let our patient entirely alone, awaiting patiently the subsidence of the spasm, which, by nature, is transient, and the restoration of normal pains; and while doing so can profitably review our ground and outline future action.

Some writers lay particular stress upon the fact that ergot and unskillful examinations, misdirected efforts at version, and instrumental methods of delivery, etc., are the causes of spasm, and would refer almost all cases to these two agents as particularly responsible; while I unhesitatingly recognize the importance of rye and meddlesome midwifery as efficient causes in the production of spasms of the os, they are causes to be avoided by the practitioner, but not inherent in the case; hardly to be considered in the management except in the consideration of the proper treatment for the unfortunate doctor whose lack of knowledge and skill has destroyed one life, possibly

two; for, with the causes mentioned at work, the child is almost invariably still-born and the mother placed in great danger. While rigidity occurs in all temperaments, it is especially to be guarded against in the neurotic of all degrees. The cervix is an erectile organ and is profoundly under the influence of the emotions and a variety of reflex irritations. Dilatation is both active and passive; active in that it is due essentially and exclusively to uterine contraction, and passive in that the circular fibres yield to the pressure exerted through the membranes and fœtus. The peculiar attachment of the longitudinal fibres to the circular fibres, by which the contraction of the former steadily lengthens the latter, is a wonderful provision. The contractions produce dilatation, and when the neck is normal, ought to be almost painless. When the circular are the strongest, or are irregularly acted upon, owing to local derangements of the longitudinal, we have rigidity of cervix. We thus account for the evil effects of flexions, hypertrophies, conical neck, local hyperplasias, etc., while the derangements of the mucous membrane limiting its free excretive processes increases the intensification of congestive tenderness.

I do not believe, as do many writers, that the neck of the uterus tends to rise above the fœtus in what is called retraction, which takes place between the pains. No matter how repeatedly thinned may become the edge of the external os, when the neck is fully dilated it retains its length, and the œdematous anterior lip is often a source of annoyance in the second stage when it has been forced between the symphysis and the advancing head, over which it is to be gently lifted when compression is not too great and the procedure practicable.

I do believe that the cervix is a fixed point to which the longitudinal fibres are attached, and from which they exert their vast force in normal labor; and it is strengthened as a fixed point by the resisting influence of the uterine contents, thus producing the initiatory physiological changes which are to result in the return of the uterus in its normal unimpregnated condition. The compression of the contents upon the inside of the orifice tends to elongate the circular cells, and also increases by reflex irritation the power of longitudinal contractions, a series of performances which we have reason to believe has been going on and in process of full development for months. Any cause which has a tendency to disarrange the equable workings of this system of well adjusted forces is a cause of rigid cervix. Excessive coition during the months of pregnancy is a very common predisposing cause of cervical irritation during labor. The condition known as spinal irritation is another. Local inflammations and diseases of the hymen, the vulvar outlet, the anus and the rectum, and the premature rupture of the membranes, have all acted as exciting causes of spasm of the cervix, while the scarcely appreciable changes in the cells of the muscular fibres produced by a syphilitic taint or inherited diathesis are extremely potent as factors in permitting irregular and otherwise abnormal activities in living tissues. Rheumatism, neuralgia and malarial toxæmia I have also met with as causes of the condition under consideration, as well as influences in the production of other puerperal complications. After a careful investigation of the salient points in the case, and the formation of a decision as to the probable causes of the trouble, with its mode of expression, we remove that cause or modify its influence, and, as far as possible, avert its consequences. Should the simple procedure already mentioned prove unavailing and the neck remain firm after several hours, the condition proving not to be a transient one, further interference becomes necessary. A long list of remedies have been proposed, which I will enumerate, with running personal comments. Where the neck is pretty well dilated, but rigid from simple weakness of the longitudinal fibres, a reinforcement by simple compression over the fundus will often develop sufficient power to overcome opposition, stimulate normal contractions and speedily terminate the labor. Such a case came to me during the past fortnight, in which delivery took place in one hour from the time assistance was ren-

dered. In a previous labor, the lady told me she had remained in a condition about as I found her for about a week. Constitutional causes were at work in this instance.

The hot douche is always in order, and will often be of great service, frequently repeated, with the patient in the recumbent position. Chloroform is one of our most reliable means for relaxing simple spasm and controlling undue movements, and may be freely used in all stages, but especially in the second. Cinnamon, borax, uva ursi, antispasmodics, valerian, chamomile, belladonna, cannabis-indica, opiate enemata, pulsatilla, laxatives, fumigation with aromatics, atropia ointment to cervix, have all been recommended, and may possibly be demanded in certain complications, readily suggesting themselves to the observant physician, although most of these drugs I think worthy of mention as relics of other days and curiosities of therapeutics. Quinine, in full doses in malarial toxæmia, and large doses of salicin in the rheumatic diathesis will prove exceedingly satisfactory. Electricity, the interrupted current, in the second stage, where longitudinal contractions are weak, has been advocated, and I would consider it a valuable procedure in unusually tedious cases. In the one case in which I used it the effect was prompt and efficient. Lefort advises morphia hypodermically; Breslau advises atropia the same way. The two combined will be found better than either alone in practice, as their sole action I believe to be narcotic. Chloral has already been mentioned in considering anatomical rigidity, and I can only repeat what I wrote then. Hypnotism has been recently suggested, and tried with seeming success in a hystero-epileptoid, but the great moral degradation likely to grow out of this proceeding will always be an insurmountable objection to its popular adoption, to say nothing about the utter inability of the average practitioner to sucessfully manipulate the subject; besides, hypnotism borders too closely upon the absurdities of what is called "Christian science" to receive any very serious attention from the intelligent or well-informed. Where excessive tenderness exists at the vulvar outlet I have excellent effects from the local application, with a bit of absorbent cotton, of a four per cent. solution of hydrochlor. cocaine (or its hypodermic injection might be better), and this has been especially apparent in those cases requiring more or less manual or instrumental interference. The same applications to the tense cervix I have also proven efficient. Macrotyne is a remedy of some value in weak contractions, but its action is slow, and it is too much like ergot in its physiological effects; bleeding has had many advocates from time immemorial, and there may be certain rare conditions in which it would be advisable, but I have never met them.

In a country like the Mississippi valley, where malarial influences are everywhere at work, and the constant tendency is to the destruction of blood corpuscles and splenitic derangement, every drop of life fluid saved is a gain and an assistance toward the safer passage of the patient through the physiological changes conducing to a perfect recovery. While I admire the nerve which would bleed to syncope under such circumstances, I cannot endorse its necessity or utility in other than the most exceptional cases. Chloroform, with careful dilatation, I believe to be safer and equally efficient.

I know that Charpentier, and others advise incision of cervix in extreme cases, in preference to dilatation, but with our present well-known means of gently extending the cervix by the cone-shaped hand or the rubber bags, I should favor incision under no circumstances apart from an obliterated os or its equivalent in a malformation. Its advocates sharply condemn the proceeding when the rigidity is at the internal os, because of immediate danger, seeming to forget the ultimate deformity and misery almost certain to follow its application to the external mouth, for these little cuts of mucous surface, with their subsequent lacerations of muscular tissue, seldom heal in a normal away, but remain for months and years a cause of local suffering, or nervous irritation, and of general ill health. In support of my views I have my own success,

as well as high authority, among whom I find Sinclair, Lusk, Gillette, of New York, Grandin and others. In an extreme case of breech presentation, with the ring tightly clasping the neck of the child and the cord, it might be justifiable, but even then, with the fingers, upon which we guide a bistoury, the cord may be shielded, and steady compression upon the fundus will soon end the trouble, unless a malposition or impacted head interferes, when incisions of the cervix will but increase the dangers, and it seems to me that we should not have permitted our patient, with her baby, to have drifted into the midst of such disastrous liabilities, and for the prevention of which I have resorted to measures not common, the claims to excellency and efficiency of which I wish now briefly to present.

The power of gossypii radix, common cotton root, in uterine derangements, is too little known. First mentioned by Dr. Bouchelle, of Mississippi, in 1841, I believe, it has been brought forward by two or three distinguished writers, but has attracted little attention except from a class of irregular practitioners, known as "eclectics," by whom, and by the colored women of the South, I am told, it is in constant use as an emmenagogue. Several patients came into my hands who confessed to having taken it as an abortifacient, with the most satisfactory results; and while they had sent for a physician, supposing his services were needed, I found invariably no services to render except the offering of advice as to general care and attention to the avoidance of possible complication. In one case of badly deformed pelvis in which it seemed advisable, after full consultation, and by consent of the parish priest, to empty the womb at the third month, I had the satisfaction of watching from day to day the effects of the drug upon the cervix. I found a great increase of congestion in the mucous membrane, free mucous discharge and general relaxation of the circular fibres, manifest in an expansion of the cervix from the third day. This continued four or five days when the ovum and secundines were expelled entire without much hemorrhage, but with severe normal labor pains. I have used the drug several times in doses of the F. e. green root, in cases of rigid cervix with irregular and inefficient pains; the relaxation has usually been prompt, the contractions steadied, strengthened and rendered normal in character, while the placenta is expelled with the least possible delay. The remedy seems to have a stimulating effect upon the entire sexual system, giving tone to the uterus proper, causing normal contractions and, at the same time, arousing the numerous glands and relaxing the circular fibres. I think the drug well worthy of careful and prolonged study, for I believe it a valuable addition to the armamentarium of the accoucheur.

Another remedy from which I have received great assistance at times is gelsemium. In all that chaos of cases in which there is an exaltation of function — in which the motor and sensory spheres of the nervous system are in a state of abnormal excitation bordering upon or involved in true tetany, gelsemium will be found a remedy of the highest grade of usefulness. Its action upon the spinal cord is directly antagonistic to those influences which make for tonic spasm; it quiets the dragging pains of the first stage of labor, while its usefulness in violent after pains is now beyond controversy. I have had some splendid results from its use in the earlier part of the first stage complicated with rigidity; in the latter period, when it may be important to stimulate longitudinal muscular fibre, its possible influence in temporarily suppressing normal uterine contractions should be taken into consideration. Because of its sedative influence upon nerve structure it is a remedy of great value in the disorders of the sexual apparatus in both sexes. The last drug, but not the least in importance, to which I will call your kind attention, is ipecac, the power of which has been hinted at in two or three pages of this paper. I can find it mentioned, apart from its emetic qualities, by but one writer, Charpentier, who merely records it in a list of remedies, giving the dose at one-half to one and two-thirds grains.

Several years ago, while successfully treating an epidemic of dysentery with ipecacuanha, always using doses just within the point of individual toleration, I met a number of cases of threatened premature labor, affected by the epidemic influence, where all the mucous and reflex phenomena of rigid cervix in the early part of the first stage would be manifest. I found a resort to the treatment to control the tenesmus and dangers of the dysenteric complication almost invariably controlled the abnormal uterine action and enabled the patient to proceed to full term. Three cases at term were so promptly relieved of the cervical spasm, with an evident impartation of such added tone and normal strength to the expulsive forces as to speedily terminate the labor in a manner most satisfactory, and with no injury to the cervical tissues. Of course I now used it in cases without dysentery, closely studying its action from a clinical standpoint, and I conclude this paper with a brief elaboration of the results of my studies.

I believe that the primary effect of ipecac is upon the nervous centres, with a special tendency to the fibres controlling mucous tissues. It has no direct effect upon the circulation, but Duckworth has shown that from toxic doses death ensues as cardiac paralysis, leading Pectolier and D'Ornellas to infer that the paralysis is probably spinal. In toxic doses it has a special influence upon the trophic nerve centres concerned in the production of hepatic glucose, in that this substance is no longer developed. In small therapeutic doses, *i. e.*, sub-depressant, it is a general stimulant to the entire spinal cord and sympathetic, and in the sick stomach of pregnancy is invaluable. In the study of the circular muscular fibres we learn, from chloroform anæsthesia, that sudden contraction of the pupils indicates diminished blood pressure in the brain with a threat of danger. Without referring to other sphincters and outlets in the economy, may I not ask, does not contraction of the cervix in spasm indicate diminished blood in the nervous centres governing the same producing and lowering of tone which results in congestion and irritation at their peripheral termini? Dyer, Duckworth and Chouppi seem to prove that emetics act directly upon the termini of nerve tracks, stimulating the centres secondarily, and this may account for the promptness and pleasantness of its action in abnormal conditions. It acts powerfully upon all the mucous membranes in stimulating gland action and unloading congested regions. This was formerly considered its only mode of action, and occurring as a result of nausea. We now know that decided nausea is an intensified and over effect, interfering with and preventing its best forms of manifest power. There is no remedy so invariably reliable as this in the capillary bronchitis of children, which is a local and pathological condition in many respects closely analogous to that which obtains in the blood vessels and tissues of the first stages of dysentery, and in irritable cervix in labor. Able writers have recommended it in post-partum hemorrhage, while no less authority than Trousseau recommends it to "be taken for some days after childbirth, to promote the natural functions peculiar to that time." In the unpleasant complications from portal congestion it acts speedily and powerfully. In swollen mucous membranes it gives prompt relief; the neck expands under its influence in the restoration of tone lost by congestion, and the contractions assume a character normal in nature and efficient in power, preventing all those extremes in rigidity which are so urgent in their demand for immediate relief, and so unfortunate in their complications. Going further than Trousseau, I give the drug in the earliest stages of labor, when there is the slightest indication pointing to a possible development of tetany or abnormal constrictions of the circular muscular bands. When the thinned edge of the os remains firm and wiry between uterine contractions its benign influence is manifest at once, and if the ring is dilated to the size of a dollar I confidently expect labor to terminate within an hour, if there are no other complications, and I am rarely disappointed. I give a dose just within the range of individual tolerance, and repeat every twenty or thirty minutes, until satisfied with the result;

commencing with one or two grains, I seldom rise above five, finding three grains perhaps to be the average efficient quantity. The drug may be associated with any other remedy, or one which the circumstances of the case demands, and will always be found a valuable aid. It will not avert the disastrous effects of an overdose of ergot, but in a class of cases where the cervix is fully dilated, hanging loose and limp, with inefficient uterine contractions, and no pelvic obstruction or perineal rigidity, cases in which my friend, Prof. Parvin, would administer ergot in small doses, I have found that a full tolerant dose of ipecac, followed in fifteen or twenty minutes with ten grains, or its equivalent, of ergot, will fully arouse normal contractions, with no tendency to cervical spasm, and will speedily terminate a labor growing unfortunate through inefficiency and delay. I believe that in this remedy we have an unappreciated power for great good in our special department, and if aught that I have written shall bring it into more prominent notice, and lead others to prove its utility and wide range of action in pathological and physiological conditions briefly reviewed, and shall incline us to demand that the parturient woman shall come earlier under our care, I shall be abundantly rewarded for my labor, as well as honored by your consideration.

## DISCUSSION.

Dr. Brooks H. Wells, of New York, did not agree with Dr. Jones concerning the great danger to the unborn child from the use of chloral. In about one hundred cases out of between six and seven hundred labors which he had had under his charge, or had witnessed, it had been used, both as an anesthetic where the first stage was unusually painful, and in spasmodic rigidity of the cervix, and in no case had he seen any harm occur to mother or child, but only the most gratifying results. He always employed the precautionary measure mentioned by Dr. Jaggard, viz., to keep himself informed of the condition of the uterus by a hand placed over the fundus, slight rotary friction or pressure overcoming any possible tendency to relaxation, and had never had any serious post-partum bleeding, either with or without the use of chloral. Its administration in full doses might blunt the pains somewhat or cause a slight somnolency in the infant. He administered the drug in ten or fifteen-grain doses, by mouth or rectum, every twenty minutes until the desired effect was produced, giving usually from two to four doses. He considered morphia and the hot douche important agents in treating the class of cases mentioned.

Dr. A. F. A. King, Washington, D. C., quoted from his article on renal troubles, and re-stated his belief that the thickening and rigidity of the cervix in primiparæ was due to displacement and premature descent of the lower segment of the womb and child below the brim during the later months of pregnancy.

# PLACENTAL DEVELOPMENT.

## DÉVELOPPEMENT PLACENTAL.

## ENTWICKELUNG DER PLACENTA.

BY HENRY O. MARCY, M.D.,

Of Boston, Mass.

Four years ago, Italy mourned the loss of one of her most brilliant sons, Count Ercolani, of Bologna, a man, like Germany's great scientist, Virchow, alike celebrated as a leader in the great political struggles for the elevation of his people and an enthusiastic devotee of science. Educated in the school of the great Antonio Alessandrini, whose learned diligence he early imitated, in the most lamentable poverty of means, he contributed to the foundation of those monuments of marvelous industry, the museums of Comparative Anatomy and Veterinary Pathological Anatomy, of Bologna. The high renown which he had acquired in the sciences and his profound learning procured him many honors. He attained the highest offices of Bologna's most famous university, being several times President of the Medical Faculty and twice Rector of the University. Aided by the government, he was enabled to erect new buildings and furnish the School of Veterinary Medicine with modern appliances for successfully carrying on original investigations in the department of comparative anatomy and physiology. Although widely known by his many original contributions to science, he is especially deserving of and receives world-wide repute for his long-continued investigations of the placental development in vertebrates.

More than ten years since, there first came to my notice an unpretending volume, published in Africa, a translation in French, by Dr. Andreini, of a certain portion of Professor Ercolani's investigations, which as a prize essay had received an award from the Academy of Sciences at Paris. In our Harvard Library, I found in the *Transactions* of the Academy of Sciences at Bologna the original papers with illustrations, published from time to time, having been presented by him as contributions to the Academy. Convinced of the singular value, as well as the originality of his work, I collated and presented to the English reading public the first edition, which included all his anatomical researches, up to the date of the publication, the last chapters of which were written specially for this English edition. In 1880 was published a second and enlarged edition, which included also Professor Ercolani's researches upon the pathological conditions of placental development, with a careful analytical review of the whole subject, written while yet suffering from the dire malady which speedily thereafter terminated his life. During all this period, I myself have carefully studied the changes incident to the uterus in the reproductive state in woman, and, as far as opportunity has been afforded me, comparative studies in animals. I am thereby convinced more than ever of the correctness of Professor Ercolani's teaching, and hold in admiration the remarkable ability and skill by which he arrived at conclusions so far-reaching, and demonstrated with singular clearness nature's uniform law of the unity of anatomical type in a simple and fundamental plan of embryonic nutrition and development.

The present occasion offers opportunity only to review very briefly some of the more important deductions to be made therefrom. In our own profession the study of reproduction has been chiefly limited to the human species, and nothing is more complex or confusing, veritably a labyrinthian riddle, than the fully developed human placenta. The uterine mucosa had been studied with some care by many investigators, in both woman and in the lower animals, for generations. To Malpighi, of the fifteenth century,

we date the first reliable demonstrations upon the mucous membrane in woman and in some species of the lower animals. He described the openings of the utricular glands into the uterine cavity, and observed that these glands, at least in the cow, increased in size during pregnancy. When we consider the lack of optical instruments in his day, his observations are worthy of special comment. Little was added to this anatomical knowledge by scientists until within the present generation.

Professor Ercolani, as the trained comparative anatomist, early devoted his attention to a careful microscopic differentiation of the mucous membrane with its glandular structure, in all the various species which he was enabled to bring under his observation. This naturally led to the investigation of the more complicated question of their function during pregnancy, and thus, little by little, was brought into differential study placentation.

The placenta is ordinarily subdivided into diffused, multiple and single. Perhaps the simplest form of the first is found in the mare. Over the whole maternal portion of the uterus, in this animal, there are developed a series of secreting glands of follicular character, and into these it is easy to trace the villi of the fœtal portion of the placenta. A fœtal villus is little more than a vascular loop covered with epithelium. The glandular follicle is equally simple in anatomical construction, and also lined with epithelium; the one, a villus of secretion, the other of absorption. This is the simplest possible type of the double structure of the placenta.

The multiple placenta of the cow offers the simplest form of this kind of placenta, common to ruminants. The glandular maternal organ is here modified, although it does not lose its elementary form of a simple follicle. The modification consists chiefly in the uterine follicles being placed parallel to the surface, and sometimes superimposed upon each other, instead of, as in the diffused placenta, being disseminated vertically over the whole internal surface of the uterus.

In the dog and cat the follicles are extraordinarily elongated into tubular glands, as it were, which are closely packed against the fœtal villi.

In woman, all that relates to the form itself of a glandular follicle, is completely lost, but the fundamental parts of a secreting organ, that is to say, the walls and cells, in a word, the gland and its secretion, are persistent.

The lesson taught by comparative anatomy lies in the following of these changes in the more simple form of placentation, and observing that in each the nutrition of the fœtus is provided for upon this simple plan. Having once determined with accuracy these facts, we are then, for the first time, prepared to devote ourselves intelligently to the discussion of the placental development in woman. It is sufficient here to make the simple statement of that which may be conceded as an accepted fact, that in woman the mucous membrane is reduced to a simple layer of epithelial cells, and that in impregnation there is a proliferation and destruction of these cells over the entire surface of the uterus. This destructive process of the epithelium on the internal surface of the uterus is, in all cases, indispensable, because this is what facilitates the setting up of the neo-formative changes from which will result the maternal portion of the placenta. This denudation of the internal surface of the uterus teaches that the formation of the decidua and the placenta is due, neither to a tumefaction nor to a transformation of the anatomical elements preëxistent at the time of conception in the uterine mucous membrane.

The neo-formative process of the maternal portion of the placenta consists in the production of new vessels which are distinguished from the ordinary uterine vessels; first, the arterial as well as the venous vessels, have only a simple endothelial wall; second, on the external surface of their wall is elaborated a layer, more or less thick, of special cells, not separable from the wall of the vessel. These are the so-called decidual or placental cells.

That the fœtal portion of the placenta is itself due to a neo-formative process has not been and cannot be questioned. It is from the constant relation established between these two parts of neo-formation that the placenta is developed. The manner in which this relation is established, gives rise to the different forms of placenta known in the mammalia. Except as viewed by Ercolani, the opinions which have been entertained, concerning the origin of the cells which enter so largely into the formation of the maternal part of the placenta, have been exceedingly vague and uncertain. Professor Turner, although concisely affirming, with Owen, that without decidua there is no formation of placenta, does not touch the important question of the origin of the decidua.

Professor Kölliker confines himself to the remark that the decidua is a transformation of the uterine mucous membrane, and not a new membrane, or the product of an exudation, as was once believed. It may be observed, however, that Professor Kölliker does not attempt to show which are the elements in the mucous membrane that compose the decidua, nor by what means they are transformed, although such an investigation should be of the highest interest to him, since the glandular follicles of new formation, as demonstrated by Prof. Ercolani, and largely confirmed by Turner, were only declared by him to be tumefactions of the preëxisting uterine mucous membrane, formed during pregnancy and disappearing after delivery.

The elementary and typical form of the two parts constituting the placenta in the mammifera, is not imaginary, but is demonstrated in its simplicity, by careful observation. It is easily recognized in the fœtal portion in the villi of the chorion, in the simpler forms of diffused placentæ, and at the beginning of development in the human species. In the maternal portion, the simple elementary form is found to be developed, and maintained through the whole period of gestation, in the uterus of certain viviparous fishes. The manner in which the relation between the two parts is established may be by simple proximity, contact, or by intimate cohesion. When the relation is that of simple nearness, the maternal portion of the placenta manifestly presents the form of a glandular organ, and has its limitation by the repetition of secretory villi upon the inner surface of the uterus, which, uniting with each other in various ways, give rise to the formation of crypts, or glandular follicles, single or compound, into which enter the absorbent villi of the chorion.

When the relation is more intimate and an adherence takes place between the two parts before mentioned, as in the single placenta, the glandular character is concealed by the fact of the adhesion, but the fundamental condition remains constant. The contact in this case is direct, between the vessel of the absorbent villus and the epithelium of the secreting villus, which is never lost. Only two very simple changes occur in the fundamental parts of the placenta when single, and they are the factors of the manifold differences which are observed. First, the loss of the epithelium of the absorbent villus, which is not important, since there is established direct contact of the vessel of the fœtal villus with the secretory epithelium of the maternal villus, and this fact is constant. Second, the dilatation, or ectasia of the vessel in the maternal villus, and this fact is remarkable only in the placenta of the quadrumana and in woman.

The ectasia in the maternal vessels, already shown under a rudimentary form in the placenta of certain mammals, had been indicated by Eschricht and Turner, as representing the large lacunæ which are observed in the placenta of some of the quadrumana, and in that of the human species. But these supposed lacunæ have been the chief, if not the only stumbling-block to the exact knowledge of the structure of the human placenta, although anatomists were aware that ectasia takes place in the placental vessels in their phases of development.

It is known that, in the earliest period of pregnancy, the placenta in the human

species is represented by a layer formed of a rather compact cellular mass called decidual serotina, or placental decidua, in the midst of which runs a network of capillary vessels. From the surface of the chorion which is in contact with this layer, the villi are formed, at first simple, which penetrate among the cells of the serotina. For a time the relation between these two parts of the placenta is not so close that they cannot be separated. It is known, moreover, that, with the progress of the development, the vessels of the primary capillary network become ectasic, and the primary simple chorial villi proliferate and become arborescent. If we could loosen and skillfully separate without tearing, the compact mass formed by the cells of the decidua serotina, before the vessels become ectasic, we should obtain exactly what comparative anatomy has very clearly shown in the single placenta of certain mammals, the dog and cat, for example, namely, a large meshed network of placental vessels everywhere surrounded by a cellular layer, placental cells.

We may easily demonstrate, in the placenta of early abortions, the gradual development of the lacunæ by ectasia, from the beginning, in the network of the capillaries amidst the mass of the placental cells, while the villi of the chorion are still quite simple.

Robin described this condition with great accuracy. The formation of the lacunæ precedes, therefore, the formation of the tufts of the villi, and cannot be an effect, since they are observed before the existence of the cause assigned by Prof. Kölliker.

Still further and more conclusive evidence upon the formation of the lacunæ, independent of the presence of the fœtal villi, may be found in the structure of the so-called uterine decidua in cases of extra-uterine pregnancy, and there is found the exact and isolated anatomical structure of the maternal portion of the placenta, in which exist lacunæ, through ectasia of the vessels, without any trace of the fœtal villi. Kölliker himself teaches that the short utero-placental arteries, when they penetrate into the placenta, lose their distinctive anatomical characteristics, that is, they no longer have muscular fibres or elastic elements; and their whole wall is formed by an endothelial layer, covered with a thin sheath of connective tissue, which disappears and blends with the decidua scrotina. He further states "that the veins are no longer to be distinguished from the arteries, and all traces of both are lost in the interior of the placenta where alone the large lacunæ are found."

In 1876, De Sinèty called attention to an important demonstration in its bearing upon the above view. He noticed that the cells of the decidua in woman form a circular sheath about the placental vessels. However, if the facts observed by him in the completely developed human placenta harmonize with those already noticed early in its development, when there is seen a minute network of capillaries that become ectasic in the midst of the cells of the decidua or placental serotina, we shall be convinced that it is not the walls of the utero-placental vessels which are lost in these cells, as was indicated by Kölliker, but that so enormous a dilatation has taken place as to render it difficult to perceive the endothelium and to separate it from the placental cells that are elaborated by their external walls.

The chorial villi in woman, while yet existing in its proliferation around the entire sac, are always covered with an epithelium of their own. The chorial villi, away from the placental site, in the atrophic state of advanced fœtal development, may still be seen covered with epithelium, although shrunken and atrophied.

But in the intimate cohesion with the maternal villi in the developing placenta, the epithelium covering the chorial villus is lost. This may be easily demonstrated by observations upon the placenta in abortions, where the death of the fœtus has for some time preceded the separation of the placenta. Here the fœtal villus is shriveled and shrunken, and is easily defined as distinct from the maternal villus with its layer of actively growing placental cells.

The belief that the lacunæ are really large cavities, as they seem to be microscopically, and not the maternal vessels greatly dilated, is still generally taught, and through this belief two other deceptive appearances are accepted as actual truths, namely, that the chorial villi float in the maternal blood, and that the epithelium covering them appertains to the fœtus instead of to the mother. Setting aside these fundamental errors, many facts already observed by able anatomists in the human placenta which have remained doubtful or were wrongly interpreted, now receive, under the teaching of Ercolani, a clear and precise explanation.

The belief that the villi in the placenta of woman float in the blood of the lacunæ, generated the physiological error that the nutrition of the fœtus, not only in the human species, but in all mammals, took place through an osmotic exchange of the two bloods, although in the case of the diffused placenta the facts openly contradict such an assertion. Beside, in all cases where the placenta is single, the vessel of the absorbent villus (fœtal) never comes in contact either with the blood or with the wall of the maternal vessel. There is always interposed between the walls of the two vessels, and, consequently, of the two bloods, a cellular layer which is the epithelium of the maternal villus, and that this is secretory is confirmed by the obvious glandular appearance which is observed in many animals in the maternal portion of the placenta when it has the diffused form.

Briefly reviewed, these changes take place in woman during pregnancy. The uterine mucous membrane, which consists of a simple layer of the epithelium closely attached to the subjacent muscular wall, disappears. It is replaced by a layer of decidual cells, proliferated from the vascular network of the uterine wall. The utricular glands are not destroyed, but, on the contrary, are increased in size. The constant secretion therefrom forms openings through the decidua vera, which may easily be traced by the unaided vision, as a sieve-like perforation. By the proliforation of the serotinal cells at the placental site, these glands are, by the pressure from their own obstructed secretion, dilated and altered, and this forms the strata, called by Kölliker the non-caducous portion of the placenta. Traces of these glands may be observed, even to the termination of pregnancy, but none whatever are found in the caducous stratum of the placenta, as defined by Kölliker, where it would be expected that they would be found, if, as claimed by him, the placenta is a transformation of the uterine mucosa.

All anatomists agree that the stratum where the placenta is formed is developed from a mass of cellular or decidual elements, traversed by a vascular network, with endothelial walls only during the first months of pregnancy, and that among these elements the fœtal villi are buried. During the first three months of pregnancy, the fœtal villi can be separated from the maternal portion without a laceration of the latter, in the same way as in the mammiferous non-deciduates.

The second period of development, by the universal consent of anatomists, begins with the establishing of two facts, the rapid and exuberant proliferation of branches from the trunk of the fœtal villi, and the ectasic process in the network of the maternal vessels. These conditions taking place contemporaneously, in a limited and circumscribed space, it must necessarily follow, as the result of simple physical and mechanical law, that the branches of the proliferating villi should press against the endothelial walls of the vessels, which are, at the same time, thinned and dilated. The ultimate result is, that the walls of the vessels, at first bent in simply toward the internal cavity of the dilating vessel, must, as the process of aneurism becomes more and more pronounced, completely invest the villus, aided also by the tension exercised upon the walls of the vessel by the rapidly proliferating branches of the villi.

Weber and Virchow observed this condition in abortions, describing the tufts of the villi as making a complete hernia in the maternal vessel. Resulting therefrom the epithelial covering of the chorial villus disappears. Intimate union with the intro-

flected wall of the maternal vessel, lined with its layer of decidual cells, ensues, and the picture of the villi swimming in the lacunæ is complete.

Professor Ercolani sums up his conclusions as follows: In all the vertebrates the nutritive material, which is to serve for the growth of the fœtus, is provided by the mother. In mammals it is supplied by the maternal portion of the placenta gradually, as the fœtus develops. In the oviparous vertebrates, the material, in the quantity necessary for the development of the fœtus, is emitted in a mass from the mother in the egg. In the mammiferous, as in the oviparous animals, the absorbent or fœtal part does not change, and it is by means of an absorbent villus, more or less complicated, that the material elaborated by the mother is conveyed to the fœtus. There is, therefore, but one law, a physiological modality, that governs the nutrition of the fœtus in vertebrates.

There is also always preserved an unfailing typical unity of anatomical structure in the placenta, in the different classes and species of mammals, and the variety and multiplicity of forms depend only on a few very simple modifications, observable in the two fundamental parts, the fœtal and the maternal, which constitute the placenta in the mammifera and in the human species.

## DISCUSSION.

Prof. SIMPSON said the obstetricians were much indebted to Dr. Marcy for coming from the Section over which he was presiding,* to give them such a lucid and instructive exposition of the recent observations on the structure and development of the placenta. He heartily endorsed Dr. Marcy's admiration of the illustrious professor of Bologna, whom he (Prof. Simpson) had the satisfaction of seeing at work in his laboratory, in 1872, and whose researches he followed with greater confidence, from the impression he had then gained of Ercolani's earnestness and honesty of purpose. The method Dr. Marcy has adopted of expounding his views as to the placental relations was a happy one, and, indeed, the only satisfactory one, proceeding from the simplest to the most complicated plans of placentation. The problem solved in the construction of the placenta, was how to bring fœtal and maternal blood vessels into such relations as would admit of interchange of effete and nutritive materials between the one system and the other. In the simplest forms, as in the ridged placenta of the sow, or the diffused placenta of the mare, the whole surface of the chorion was vascular and applied to a corresponding hyperæmic surface of the uterine mucosa, slight fœtal ridges, or projections, fitting into shallow furrows or depressions, with such slender connection that when the ovum was expelled, not even the epithelial surface of the uterus was affected. In the policotyledonary placenta of the ruminants, specially enlarged groups of fœtal villi on limited portions of the chorionic surface dipped down into specially developed crypts in limited areas of the uterine mucosa, and when the ovum was expelled, the fœtal villi were often found to have carried off some of the uterine epithelium attached to their extremities. In the still more limited zonary placenta of the carnivora, the fusion became still more intimate, so that on expulsion of the ovum some of the sub-epithelial decidual tissue was carried off by the fœtal villi, without, however, causing any necessary injury to the maternal blood vessels. Where the placental site became still more distinctly limited, as in the case of the two-toed sloth, Sir William Turner, to whose researches Dr. Marcy had referred, and whom he (Prof. Simpson) was proud to claim as his colleague and friend, had made the interesting observation that the capillaries in the maternal mucosa had become distended at parts presenting an aneurismal or

* Gynæcology.

varicose appearance. This helped to the understanding of the changes that took place in the capillaries of the human serotina, which probably passed through a similar stage before becoming developed into the placental sinuses, which Weber had described as "colossal capillaries." In the human placenta, the fusion of chorionic and mucosal tissues had become so intimate and intricate, that when the ovum was thrown off, the chorion carried with it the greater part of the thickness of the uterine mucous membrane, leaving only a thin layer corresponding to the blind extremities of the follicles attached to the subjacent muscular wall. The exact condition of the capillary arrangement in the placenta, it was right to remember, could not yet be regarded as definitively settled. In a recent work published by the lamented Schroeder, in conjunction with some of his pupils, one of these had an article denying the existence of the cavernous spaces usually supposed to exist in the placenta, and further observations must be made at various stages of development before a true anatomy of the placental vessels can be arrived at. As regards the simple layer of epithelial cells, which most observers now recognize as the only intermediary between the maternal and fœtal blood, he (Prof. Simpson) had, at one time, followed Virchow in regarding them as of fœtal origin. The more recent observations, however, of Turner and others, had convinced him that Dr. Marcy was correct in following Ercolani, who was the first definitely to declare them to be maternal in their origin.

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## THE RELATION OF THE MEMBRANES TO THE PROCESS OF PARTURITION.

### LE RAPPORT DES MEMBRANES AVEC LE PROGRÈS DE L'ENFANTEMENT.

### DAS VERHÄLTNISS DER EIHÄUTE ZUR GEBURT.

BY HENRY T. BYFORD, M. D.,

Of Chicago, Ill.

In a short article, read before the Chicago Gynæcological Society, Feb. 20th, 1885,* I called attention to the fact that the pouch of membranes may normally fill the vagina and present at the vulvo-vaginal entrance during the second stage of labor, much the same as they present at the os during the first stage, and that the pouch then aids the presenting part of the child in dilating the vulvo-vaginal as well as the uterine outlet. I explained the mechanism of delivery under such circumstances, and the advantage gained in the way of a graduated and safe dilatation of the perineum; I also called attention to the deplorable frequency of pathological states in connection with labor, and did not hesitate to lay the blame to our erroneous methods of conducting it.

In another article,† written in answer to a criticism, by Prof. Leon Dumas,‡ I showed that the membranes presented at the vulva in an average of seventy-five per cent.

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* *Chicago Medical Journal and Examiner*, March, 1885.

† "De la preservation des membranes, pendant la deuxième periode de travail." H. T. Byford, *Annales de Gynécologie*, 1886.

‡ "Nouvelles considérations sur la dilatation prœ-fœtale de la vulve, etc." *Annales de Gynécologie*, September and October, 1885.

of cases in the practice of eleven physicians of my acquaintance. I also showed that theoretical demonstrations and experimental researches cannot be relied upon in determining the time of rupture of the membranes, and that the early rupture of the membranes observed clinically, both in the past and present, has been due to interference, either directly or indirectly, on the part of the physician, the patient or her friends. I showed that the natural course of labor had been changed by the accumulated customs of uncivilized nations, by the officious ignorance of modern midwives, the scientific examinations and interference of the self-reliant obstetrician, and the traditions of the laity in the past and present. I proposed a conduct of labor, so simple that the most ignorant midwife might easily learn to follow it out, yet one in which these detrimental factors were eliminated.

I do not now wish to again discuss the practicability of utilizing membranes during the second stage of labor, but briefly to explain the relationship of the membranes to the process of parturition, when conducted according to the method I have advocated, insisting less upon the fact that they should remain intact during the whole of the second stage of labor, than that they should not be interfered with at the end of the first stage. I will not consume your time and patience with more arguments. I wish merely to state the conclusions derived from a study of the behavior of the membranes in labor.

The continued presence of the amniotic fluid in utero is necessary for the retention of the living fœtus until the end of gestation; *after that* it is unnecessary for the progress and completion of labor in any stage. It is a fact established by experience, that the loss of the amniotic fluid brings on, as a rule, abortion or labor; and the more complete its evacuation, the quicker, more forcible, and, usually, the more effective the uterine contractions. If we wish to hurry up labor, we can do so by rupturing the membranes and securing an escape of the waters, either before labor, during the first stage, or during the second. When the membranes rupture before labor is due, the pains commence as soon as the liquor amnii has all, or nearly all, escaped. Sometimes the head acts as a ball valve, preventing the escape of the fluid, except in small quantities, and allows gestation to go on for weeks, or until labor sets in from natural causes.

The time of the rupture of the membranes in a given number of conceptions will not, in a majority of cases, be at the end of the first stage. In a large proportion it occurs before the child is viable, and ends in abortion; in quite a number it occurs before gestation is completed, and induces premature labor; in a considerable percentage it occurs when the os begins to dilate, and gives rise to what is popularly called dry labor; in a few it occurs early in the first stage, and determines a rapid, painful delivery; in quite a number it takes place when the os is widely, but not completely dilated; in quite a large percentage it occurs after such complete dilatation. Thus the integrity of the ovisac is not necessary to parturition in any stage, but that is no proof that it is not useful in all stages.

Theory, experimentation, and clinical fact have failed to demonstrate that the membranes, if interfered with, must rupture at the end of the first stage of labor. Why, therefore, should this be considered the time? Among three hundred and thirteen accoucheurs with whom I communicated, seventy-two reported that they were not in the habit of rupturing the membranes at the end of the first stage. The average percentage of cases of labor in which these gentlemen observed the pouch of membranes to come down to, or protrude at, the vulva was 33 per cent. The first authority whom I find to state distinctly that the membranes rupture at the end of the first stage, was Denman. He so stated it for the sake of simplifying and condensing the description of labor in his aphorisms, and his art so pleased the artistic sense of the profession that they have ever since mistaken it for unaltered nature.

The fact is, that the membranes, as a rule, rupture at no particular time, and the time they are observed to rupture in the practice of any man serves more as an illustration of the condition of the cases as conducted by him, than the natural time for rupture. It may be said, in a general way, that the greater the amount of interference by disease, the sooner will be the rupture. Syphilis will bring on abortion and rupture, or separation of the membranes early in gestation, according to the amount of disease. Severer forms of uterine disease will produce abortion, less severe ones will cause adherence of the membranes, and consequent rupture before or at the beginning of labor; localized uterine disease may cause rupture later, when the adhesions or the weakened place in the membranes may be higher up and not interfered with until the os is nearly open. Under perfectly healthy surroundings, the membranes separate without rupture, fill the whole parturient canal and protrude at the vulva the same as at the os uteri. When the membranes rupture at the beginning of labor, the process is rapidly, and usually safely, completed, yet the membranes are of value in dilating the os uteri; when they rupture at the complete dilatation of the os, the process is also rapidly and quite safely completed, but this is no reason why they may not have other functions, viz.: to descend and line the vaginal cavity, so as to shield the child's features from the maternal secretions, to act as a cushion, a wedge, a lubricator, a director, a regulator, and thus, not only in the first, but in the second stage also, play the part of a safeguard to the mother and a protector to the child.

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## TREATMENT OF OCCIPITO-POSTERIOR POSITIONS.

### TRAITEMENT DES POSITIONS OCCIPITO-POSTÉRIEURES.

### BEHANDLUNG DER VORDERSCHEITELLAGEN.

BY J. ALGERNON TEMPLE, M.D., M.R.C.S. ENG.;

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The treatment of these special positions, as dealt with in our modern text-books, varies somewhat, no absolute special rule being insisted on, though a large number of writers seem rather to favor the plan of non-interference till nature fails to accomplish the anterior rotation of the occiput, when assistance is then rendered by the forceps or vectis, and the labor terminated. The patient, however, by this time has endured many hours of fruitless pain, and is, perhaps, almost exhausted. I think the consideration of the treatment of these cases deserves more attention from the profession than it at present receives. Most certainly, a large number rotate forward without artificial aid or even without much difficulty. Still, however, there is a certain number of cases (stated to be four per cent.) in which, after difficulty and delay, rotation does not take place; the woman, after undergoing many hours of severe and prolonged pain, is brought to a stage of almost complete exhaustion and arrest of labor, and the physician is obliged to step in and assist by art or else leave the patient to die undelivered. The object of this paper is to discuss the advisability of a plan of treatment to help these few, not the majority.

Some years ago I was led to a careful consideration of the subject of treatment and

the advisability of early manual assistance, so as to rotate the occiput forward, and not depend on nature to do so; after the most careful watching of many cases, I finally decided in favor of manual assistance, and now, after some years of trial, I am still more strongly impressed in favor of this treatment as being perfectly safe to the child and most decidedly beneficial to the mother; the delivery is shortened; the mother is saved much pain and risk of injury to her soft structures, especially the perineum. In those cases in which rotation does not spontaneously occur, and the birth is finally effected by the forceps—delivering the occiput over the perineum—there is always a much greater liability to rupture of this body, owing to its greater distention, and this is particularly so in primiparæ, especially if they happen to be somewhat advanced in life. At all events, if no injury to the perineum occurs, the woman, at least, has undergone a long and painful delivery.

It is not my intention to discuss the mechanism; suffice it to say that one of the main agents in favoring anterior rotation of the occiput is to be found in the resistance of the perineum, as conclusively proved by the experiments of Dubois on the cadaver. Still, however, unless flexion is a very complete act at an early stage of the labor, delay in the descent is almost sure to occur, and the occiput in such cases is delayed at the very brim of the pelvis by the brow pressing on the pubes.

If you contrast the mechanism in an occipito-anterior position with an occipito-posterior one, you will see at a glance they are exactly antipodal to one another. In the former, everything is favorable for quick and easy delivery; the occiput, which must first emerge at the vulva, has but a short way to travel to reach the pubic arch, the least resistance is offered to the advancing head through friction, and the uterus is transmitting its forces in the most effective way through the spinal column and breech of the child in the axis of the entire fœtal ovoid.

In a posterior-occipital position everything is the reverse; the occiput has the longest route to travel from the sacro-iliac synchondrosis to the pubic arch—at least three times as far; the greatest amount of friction is thus necessarily produced, preventing the onward progress of the head, and the uterus is acting to a great disadvantage. In all cases when the dorsum of the child is backward, the forces are directed posteriorly instead of anteriorly, a large amount is lost on the sacral structures, and it follows in those where rotation does not occur, but the occiput is born posteriorly, that the head is only slowly and imperfectly propelled, because the uterine forces, instead of passing through the head as part of the general ovoid, pass out of the ovoid at the nape of the neck. And yet these labors are called natural in our text-books, while to my mind they are dissimilar in almost every respect, and they might well be placed under the same heading as preternatural labors.

Now, in regard to the treatment: Some writers, as West, recommend upward pressure on the os frontis, to assist flexion; in some cases this simple plan is effective. Hodge advises traction on the occiput with the vectis or fillet, so as to cause flexion. Galabin also advises the vectis; this also sometimes succeeds, but not always. There are some who do not say one word about the treatment, simply leave all to nature, and when she has failed, then apply the forceps. Smellie advises rotation to be made early by the forceps. Burns advises rotation by the fingers. Leishmann advises the forceps when the head is free at the brim. Barnes admits that in the majority of cases to which he has been called to apply the forceps the delay was due to the occipito-posterior positions, and it is just with the view of preventing a long, painful, tedious labor that I would like to see some definite plan adopted as regards the early rotation of these positions whenever opportunity offers of so doing. Warren Bricked once made the following statement, which so exactly agrees with my notions, that I am induced to copy in full his words: "Because a woman can deliver herself in occipito-positions, we are not, necessarily, to expect her to do it; on the contrary, for the sake of both mother

and child, we had better presume that she most probably cannot. If we see the case early, therefore, let us use early exertion to convert it into an anterior position. If we fail, or if we have not had the privilege of the effort, let us not, under the happy conviction that she is in natural labor, permit her to extend the extraordinary efforts which are necessary to deliver herself.

"Realize fully that before you is a patient suffering far beyond the prevailing demand, in order that she may extrude her child; that the extraordinary pressure and effort to which she is subjected tell of more than possible evils to her, and that the distortions and pressure to which the child is subjected only too frequently result in death, or long, protracted and distressing suffering. Realize these things and help your patient."

For my own part, whenever I am fortunate enough to see my patient early in labor and before the rupture of the membranes, or even after, and before the head has descended very low into the pelvis, before the shoulders have engaged the brim, I give my patient chloroform sufficient to quiet all resistance, and then carefully disinfecting my hand and oiling it, cautiously introduce it wholly into the vagina, taking great care not to injure this part by undue haste, and pass it on till I reach the head, then, seizing it between the points of my fingers and thumb in the interval between a pain, I rotate the occiput forward. This is very simply done, especially before the rupture of the membranes. I then leave it to proceed as a normal case of labor.

Even after the head has engaged the brim, it is easily done, providing the shoulders are above the brim; or, at least, if they have engaged the pelvic cavity, and are not too firmly wedged there, with assistance by external palpation, chloroform and patience, much can be done.

Dr. Harris objects to this plan of treatment, which was so strongly recommended by Dr. Parry, on the ground that the introducing of the hand within the vulva may cause laceration. Such an objection is not valid; it might be used equally against turning = no man has a hand as big as a fœtal head. With the use of chloroform, the hand may be gently passed without fear of injury.

Till I adopted this plan of treatment, I, like Dr. Barnes, had frequently to use my forceps after my patient had suffered long and painful, though fruitless, efforts at delivery. Once the shoulders have become firmly wedged in the pelvis, I do not think it altogether a safe plan to follow. I then leave my cases to nature, offering such assistance as the vectis, or pressure by the fingers in the direction of rotation, endeavoring to favor both flexion and rotation. If these measures fail, then I apply the forceps making slow traction, but not attempting rotation. If it is disposed to occur, I do not interfere; if, on the other hand, no effort is made by nature at rotation, I then deliver with the occiput at the perineum, preferring, undoubtedly, a pair of straight forceps giving the perineum plenty of time to dilate and using chloroform in all cases. I am not laying claim to any new plan of treatment, but merely stating my own experience and my invariable plan of treatment of every suitable case.

The success I have met with in the past induces me to write these few lines on a most important subject.

# PUERPERAL URÆMIC AMAUROSIS.

## AMAUROSE URÉMIQUE PUERPÉRALE.

## PUERPERALE URÄMISCHE AMAUROSE.

BY JOHN H. WILSON, M.D.,

Of Chicago, Ill.

There are no diseases of greater importance to the general practitioner than those of pregnancy. For they involve the question of life.

In referring to our text-books on obstetrics, we find that puerperal uræmic amaurosis has only received a passing notice, and nowhere do we find a satisfactory account of this subject, not even in works on ophthalmology.

"Pathology itself still owes us a satisfactory explanation as to how the eye or the ear become involved."

According to Blot and Litzman, albuminuria is met with in twenty per cent. of pregnant women. Of these, five to nine per cent. present an affection of the eye, and in one-half to one per cent. marked structural changes remain.

But it is, on the whole, a rather infrequent affection, and one which deserves our closest scrutiny; "for it belongs to a group of symptoms which threaten danger to life."

Dr. Hofmeier says, according to *Berlin. Univ. Gyn. Inst.*, that in 10½ years there were 137 cases of nephritis complicating pregnancy, out of a total of 5000 deliveries. But not one case of amaurosis was noted. In 2600 cases reported at different times in the *Boston Medical and Surgical Journal* not one case of amaurosis arising during gestation was noted; thus proving its infrequency.

Although amaurosis is very often dependent upon nephritis, as is seen in chronic Bright's disease, being caused by uræmia, in which the nephritis enters as the important factor in the production thereof, and is generally associated with the "contracted kidney," still it is not restricted. But the albuminuria enters as a constant factor in its production, as is admitted by Braun, Frerichs, and others.

There are cases on record where the eye symptoms existed without any disease of the kidney being discoverable; in some, not even the most delicate test revealing the presence of that much-abused and so-called pathognomonic symptom, albuminuria (Von Buhl and Freidenwald). Yet the amaurosis has been laid, and quite justly, at the door of uræmia.

The eye shares the various functional derangements of our system, as is seen in anæmia and after "flooding." In some women, at each menstrual epoch impairment of vision supervenes with the onset of the flow. We see cases which illustrate this. And should we not watch her pregnancy with doubtful forebodings? But oftener we find impaired vision with suppressed menses. In this latter it has been explained by supposing that it led to congestion of the vessels of the brain and eye. The opposite hypothesis having been used to explain the cause of the amaurosis following "flooding." The amaurosis is sometimes the only symptom, cerebral, which shows itself as the result of the toxæmia. These cases are on record:—

CASE I.—Recently I saw one, accompanied with an increased flow of urine, low specific gravity, albumen one-eighth per cent., no casts and few epithelial cells. Sight was defective; could only read the large head-lines in a newspaper. The loss of sight progressively increased. Later, marked anæmia showed itself and the usual symptoms of uræmia. Labor was induced at the end of the fourth month. The eyes have not regained normal vision. One symptom was interesting: the amount of urine was

never greatly decreased. The urine showed a trace of albumen at the end of four months after labor, but no casts.

*Etiology.*—Heredity as a factor enters largely into the etiology. Thus, Baer (Tanner's "Dis. of Preg.") saw it develop in middle life in three successive generations, in all the females who had borne children, the men showing a tendency, without becoming blind. Dr. Doe, in *Boston Medical and Surgical Journal, 1887*, mentions having seen it four times in one family. I also have notes where amaurosis was present with each of four pregnancies in two successive generations. Dr. Friedenwald, in a paper read before the Baltimore Medical Society, on this subject (*Medical News*, June, 1884), says, in speaking of the uræmia as the cause, that "we cannot ascribe the amaurosis to the intensity of the intoxication; for examples are not wanting in which the uræmic symptoms have gradually developed from headache to convulsions and coma, sight having remained intact." While there are others in which amaurosis appeared as the only prominent symptom. This he illustrates in one of his cases. But it is not only with regard to uræmic amaurosis that this obscurity exists. We find it equally difficult to explain the absence of all uræmic symptoms in many cases of kidney disease in which the urinary analysis and the very pronounced dropsy testified to the existence of grave lesions, while, on the other hand, we are sometimes suddenly confronted with very threatening uræmic manifestations, when the urinary analysis may show but a trace of albumen." But we can seldom attribute its occurrence to the influence of any single cause, but to a number of circumstances, which have been acting for a length of time upon one individual, either together or consecutively. Quite frequently is it the oculist, who, being consulted about the failing eyesight of his patient, finds, upon making an ophthalmoscopic examination, that his patient has Bright's disease, of which, till then, she was ignorant. In uræmia, the amaurosis is generally ascribed to the poisonous material in the circulation. "Modern researches have shown that there is an intimate connection between many other affections and albuminuria; as, for example, certain forms of paralysis, either of special nerves, as puerperal amaurosis, or of the spinal system. It cannot, therefore, be doubted that albuminuria in the pregnant woman is liable, at any rate, to be associated with grave disease, although the present state of our knowledge does not enable us to define very distinctly its precise mode of action."—Playfair. The amaurosis of uræmia has also been ascribed to effusion into the brain substance or ventricles, and this the result of increased blood pressure, which was developed with the amaurosis. This increased blood pressure has been explained by supposing that there was a relative constriction of the aorta in these cases, which intensifies the hypertrophy of the left ventricle. Hence is explained the increased arterial pressure and cardiac hypertrophy, not by granular atrophy of the kidney, nor by a general arterio-capillary fibrosis, but by hypertrophy of the left ventricle and relative constriction of the aorta by a gravid uterus, and excessive muscular exertion of cardiac muscles.

Dr. A. F. A. King, in *American Journal of Obstetrics, 1887*, Nos. 3 and 4, has a new theory, or "A new Explanation of the Renal Troubles and other Pathological Phenomena of Pregnancy and Labor." His theory is, that disturbances in the renal circulation and renal functions are produced chiefly by pressure of the gravid uterus upon the abdominal aorta or its branches, or upon the vena cava or its branches, or upon both or all of these, in consequence of the child and womb not maintaining during pregnancy their normal lateral obliquity above the pelvic brim. The normal position of child and womb is intrinsically the same in primiparæ as in multiparæ. Dr. King shows, theoretically, that when the normal obliquity of womb and child is maintained during pregnancy, there will be no injurious compression upon any blood vessels.

It is not within the limits of this paper to enter minutely into the various hypotheses which have been advanced to explain the causes of the uræmia and of the amaurosis. Uræmia has been caused by injecting I. Urea, or, II. Urine under the skin.

The convulsions were decidedly uræmic in character. Large quantities, however, were required to produce the phenomena. Prof. Bouchard (*Journal de l'Anatomie et de la Physiologie*, No. 5) concluded, from his experiments from the injection of urine, that several alkaloids reside in, or can be rapidly formed from, the different urinary constituents. III. Increase of the potash salts in the blood. (D'Espine.) The passage of the potash salts into the circulation greatly raises the arterial tension by their direct action upon the endocardium, and, intermediately, upon the cardiac nerves. "Potassæmia."

Dr. Ralph believes "that it is due not to the retention of any one poisonous agent in the blood, but to the general accumulation of excretory products in the tissues and fluids of the body; this accumulation depending partly on retrograde metamorphosis of muscular tissue, which, as Voit showed, took place in Bright's disease, and also diminished metabolism, by which the organic products liberated by the retrograde metamorphosis were not reduced to the lowest terms, and, consequently, are not so promptly removed." IV. Excess of urea. V. Decomposition of urea into ammonia carbonate and carbonic acid. VI. The failure to eliminate the urea, which the renal epithelium was unable to convert by disease, the kreatin and kreatinin of the blood (Dalton). VII. Nephritis. VIII. Uræmia, caused by withdrawal of nutritive material of the blood, or, at least, to altered percentage relationship between it and the effete (extractive) materials. The mal-nutrition, the result of a poison in the blood, is far from an uncommon occurrence; the presence of the poison interferes with assimilation generally and the formation of the complex body. IX. Hæmoglobin, in particular. Consequently, X. Anæmia is a common feature.

The amaurosis has been caused by, I. Albuminaria and uræmia. II. Paralysis due to albuminuria and uræmia. III. Paralysis independent of uræmia and mostly functional. IV. Due to hemorrhage and apoplexy. "Perhaps it is but an exaggeration of the highly susceptible state of the nervous system generally associated with gestation. Want of sleep carried to a great extent may produce serious trouble, from the irritability and exhaustion it produces." V. Hysteria. VI. Impoverishment of the blood, anæmia, hydræmia, potassæmia. VII. Neuro-retinitis, and sometimes fulminant blindness. VIII. Turgid state of renal venous system, and a super-albuminous condition of the blood, caused by the unusual call for nutritive supply on the part of the fœtus. The retinal alterations in cases of uræmia, with complete or partial loss of vision, are to be regarded as preëxisting, the amaurosis being an additional complication (Friedenwald, in *Med. News*). That is, the one not necessarily being the sequence of the other. In nephritic amaurosis, complete or partial blindness is seldom met with, and when it is, we attribute it to uræmia.

Pregnancy enters into the etiology of nephritis. But "because albumen occurs in pregnant women, it does not follow that it is always caused by pregnancy. Women, pregnant or not, are liable to nephritis and uræmia, and it may not be discovered till pregnancy leads to a urinary examination. Nevertheless, pregnancy is, I believe, sometimes the cause of nephritis, which, in its turn, may cause amaurosis." (Millard, "On Bright's Disease.") This theory is supported, to a considerable extent, by the fact that autopsies show, in a majority of cases, a condition of intense hyperæmia similar to that which is produced by cardiac obstruction; in the first stage the kidneys are enlarged beyond their natural size, and in advanced stages, become contracted. This contracted kidney is due to one of two causes: first, to a primary inflammation of the connective tissue, or, second, which is more commonly the case, according to Dickinson, supported by Braun (who gives the results of twelve autopsies after death from puerperal eclampsia), it is what is known as the "cyanotic kidney," the contraction and induration being, perhaps, due to inflammation resulting from venous stasis, produced by impeded return of blood from the renal veins. And this resulting from the

effects of pressure of the gravid uterus." Braun states that in Vienna 44 cases of eclampsia occurred in 24,000 confinements.

If, now, we assume that nephritis was the cause of the eclampsia in all these cases, and, further, admit Rosenstein's conclusion, that in one-fourth of all the cases of nephritis eclamptic attacks occur, we find, as the result, that one case of nephritis occurs in about 136 cases of pregnancy. Bartels, in *Ziemssen's Cyclopædia*, says, "The cyanotic contracted kidney may be the result, not of one pregnancy, but of several, as was the case in one instance where the patient suffered from albuminuria in six pregnancies, the albumen not disappearing between the pregnancies. That the recognition of the truth of the theory that the albuminuria of pregnancy is produced by the pressure of the gravid uterus is of importance, is manifested from the fact that upon its acceptance or rejection must sometimes depend the decision of the physician whether good will be done by inducing premature delivery. (Millard.)

In the proceedings of the Boston Obstetrical Society, May, 1877, I found the record of a case of Bright's disease, which developed during pregnancy, in which premature labor was induced, and in which there were marked retinal changes. The labor was induced on account of the alarming symptoms of uræmia, and hoping to save the vision of the patient. Cases of temporary and permanent blindness occasionally follow labor. I find the record of a case in the proceedings of the Philadelphia Clinical Society for May, 1884 — the pregnancy and labor being a perfectly normal one, not even suggesting the examination of the urine. In the discussion, Dr. L. B. Hall thought that the blindness was explained more plausibly on the ground of the œdema giving rise to "choked disk;" the uræmic origin of such cases had been assumed. Dr. Sinclair, of Boston, reported a case, a multipara and six months pregnant. She complained of blurred vision following very severe headache. Ten days later she complained of not being able to see a light. The urine, on boiling, deposited half its bulk of coagulated albumen. Delivery by manual dilatation. Eyesight in ninety-six hours had not returned. The blindness was perfectly uniform. (*Boston M. & S. Journal*, Vol. CVII, No. 20.)

CASE II.— I saw a case very similar to Dr. Sinclair's. After the loss of vision, in four days, she died of eclampsia. Labor was induced, manual dilatation, at seven and a half months.

CASE III.— In another case, a primipara, æt. thirty-nine years, pregnant in four months following marriage. Œdema, headache and vomiting began at fifth month. Later, at six and a half months, complained of loss of sight. Urine one-third albumen, amount diminished. Micturition frequent, small amount passed. No microscopic examination was made, I believe. The failure of vision progressively increased, along with the other symptoms. The dangers of eclampsia and of death were pointed out and induction of labor advised, but not allowed. At seven and a half months eclampsia set in, and she died. The child was delivered by Cæsarean section, but was dead. Complete blindness before death for several days. No ophthalmoscopic examination was made.

Dr. Abbott, *Boston M. & S. Journal*, Vol. CVII, also reported a case of almost total blindness in a case of albuminuria of pregnancy, coming on immediately after a miscarriage at seventh month. Four days later she was only able to distinguish the features of her bedside attendants.

When amaurosis occurs as a complication of pregnancy, it, as a rule, disappears with delivery, and eyesight returns. Thus, Leishmann, Tanner, Playfair, and other authorities write. But the loss of vision suddenly appearing, and progressively increasing, does not; and unless it is arrested by the induction of labor great impairment of vision, if not almost complete blindness, follows. More recently Dr. Carl Schweigger in "Handbuch der Speciellen Augenheilkunde," writes: "Probably even the affection of the retinæ would heal, in not a few cases, if the patient remained alive." In case

in which the constitutional disease allows of a better prognosis, *e. g.*, albuminuria during pregnancy, observation has shown that the retinitis may almost or quite disappear with cotemporaneous improvement of vision.

CASE IV.—In one case, which occurred in the puerperal state, which I saw, the retinal affection healed with the restoration of vision following induced miscarriage. Both affections returned in a subsequent pregnancy, and again healed a second time, following delivery. During the second attack, at the acme of the disease, both eyes had only $V = \frac{1}{100}$. Five months later one eye showed $V = \frac{1}{2}$, other only about $\frac{1}{4}$, as a dark and somewhat prominent spot remained on the macula lutea. Cases on record show that the amaurosis returned with each of six pregnancies, to be followed by vision shortly after delivery. In one case in which quinia was administered during pregnancy, after eighty grains had been given amaurosis suddenly developed and remained. In this case no disease of the kidney was discoverable. The quinia was suspended, and vision returned. Then it was exhibited again, and the amaurosis appeared, and receded with its discontinuance, sight partially returning. Dr. H. Knapp, of New York city, read a paper on neuro-retinitis, with fulminant blindness, the result, he thought, of uræmia, although urinary analysis gave negative results—this being the only symptom of Bright's disease which was present. According to Charcot, autopsies show that albuminous retinitis presents white placques, traversed by small hemorrhagic striæ, and is due to uræmia. Dr. Augur reported a case of blindness during pregnancy, in 1880. Patient was perfectly well, save that she was so blind as to be unable to tell whether the lamps were lighted or not. She had been in this condition twelve to fourteen hours. Labor was induced, and in thirty-six hours she could discern objects. There were no other abnormal symptoms.

CASE V.—In another case which I saw—Mrs. G. æt. thirty-five years, married six months, and pregnant for the first time—everything went well till about the seventh month, when hearing became defective. No other abnormal symptom, except that occasionally she complained "that she believed her eyesight was not as sharp as before." The deafness grew worse, until she could only understand you when you "howled in her ear" at the top of your voice. She was delivered at term. Her hearing has only slightly increased. Case occurred five years ago.

Cases affecting the hearing are very much rarer than those of the eye. Urinary analysis gave negative results. Whether retinitis may not be due to secondary nephritis can hardly be decided in all cases. In some the evidence points strongly in this direction, while in others the influence of nephritis must be positively excluded. Frequently there were found simple retinal hemorrhage, often complicated with hemorrhage into the vitreous—apoplectic retinitis; in others there was retinitis, with hemorrhage and white patches not to be distinguished from those seen in Bright's disease. The etiology is obscure, but Clifford Allbutt, Seguin, Noyes, Steffen and Erb have noticed the association of the two; also Dreschfeld and Chisholm. Clinically, these cases of amaurosis not due to nephritis, albuminuria or uræmia are of great importance, as they simulate coarse diseases of the brain. In these cases of blindness, which may be absolute, the pupils still react to light, which appears to show that the centre of pupillary action is in or near the corpora quadrigemina, and that this remains intact, although the higher centres may be absent or atrophied. The blindness has been explained by supposing that there was an accumulation of fluid within the ventricles, and the pressure produced blindness. But this explanation would only serve for a few cases. (Nettleship.)

CASE VI.—Mrs. S. F., married, an Irish-American, æt. thirty-five years. Had been married nearly two years. Came to see what could be done with her eyesight, as she was almost helpless and had to be led. Could distinguish a person by the "shadow," as she explained. Three or four months following marriage she became pregnant. Family and personal history were good. Before marriage, health was excellent, except that

once in a while she suffered from sick-headache. In early part of pregnancy she felt remarkably well. At fifth month she received a slight fall, although she and her husband felt the fœtal movements after this for some time. After a month, she first noticed that her limbs and feet were œdematous, and occasionally she vomited. A little later she began to be occasionally dizzy and drowsy. At about the seventh month she began to experience difficulty in seeing anything light or light colored, and there were "sounds in her ears." In two days she was unable to recognize objects smaller than the large headings of a newspaper. Could not do so by looking directly at them, but by turning her head to one side and upward. At this time, as she was getting worse, she consulted her family physician, who told her that her eyesight would return after delivery; nor was there any need of medicine or any interference. Neither she nor her husband felt or perceived any fœtal motions after this. Headache became frequent and severe, and blindness was complete. At the eighth month premature labor set in, and a male child, still-born, weight three pounds, was born. After this there was an amelioration of all her symptoms, except that her eyesight did not return. No urinary analysis was made during pregnancy. When seen there was a dull, vacant expression, and her face did not light up when she was talking. There was a feeling of fullness in both eyes, and they were tender on touch. The irides responded very sluggishly to light and were widely dilated. Upon ophthalmoscopic examination, atrophy of the optic nerve was found: spots, size of pea over retina. $V = \frac{1}{11}$. The mediæ were clear, papillæ pale and whitish and veins dilated. Glistening white bodies over retina of left eye, the result of hemorrhage. Some blood clots. As she had pain in back, her urine was examined and potassium iodide was prescribed. There was that peculiar vacant expression in both eyes, an unmeaning stare, and pupils contracted only half-way when light was held in front of them. Eyes do not converge toward an object, but appear to be looking steadfastly at something in the distance. Feels uncertain in all her movements.

*Analysis of Urine.*—Color pale, specific gravity 1014, odor peculiar, sediment considerable, reaction acid, urea and uric acid normal, chlorides slightly diminished. Albumen $\frac{1}{8}$ %—serum-albumen. Micturition frequent, with small amount at each act; about 1200 cc. in 24 hours. Bile and sugar absent. Sediment microscopically.—Vaginal and bladder epithelium, few crystals, amorphous urates. Columnar epithelium. Very few blood corpuscles. Date, August 13th, 1884.

September 1st. Examined again, eyesight about the same. Retinæ free from hemorrhagic spots. Atrophy of (nasal) half of optic nerve of left eye. Right, superior half atrophied. Urinary analysis same. No casts were found. Albumen only a trace. Physical examination revealed nothing abnormal. During pregnancy there was a disinclination to move head, as each movement was painful. Treatment continued. October 14th. Pupils respond much more readily to light now than before, but the muscular contraction of irides easily exhausted, and there would follow a failure of response. They contracted and dilated faster than before. Can see better, as large print and telegraph wires. Same feeling of fullness. Ophthalmic appearances the same. Urinary analysis same as last. Eyesight did not increase under strychnia. Prognosis, as far as eyesight is concerned, unfavorable. Induction of premature labor would alone have saved the vision. Premature labor should be induced, to save the vision and the life, perhaps, of patients. Although there are cases of puerperal amaurosis which go nearly to term, the dangers of death from eclampsia are thereby increased.

In my case, the headache and vomiting preceded the amaurosis, and was not followed by either coma or convulsions, the amaurosis being the highest point in the intensity of the case, from which all the other symptoms receded.

Age. Most frequently met with in primipara and after thirty-one years. The tendency to complications seems to increase with increase of age. As Courtade, in

*Arch. des Theologie*, says: "Morbid complications occurring during pregnancy, which are either accidental or due to gestation, attain their maximum of frequency with old primipara."

"Although highly albuminous urine, dropsical effusion and threatened convulsions may give way to recovery, yet absence of these complications may only preclude death, when the only symptom had been loss of vision. Should not, then, this symptom be also a warning? and why may not labor be induced to save the sight, when, from a series of reported cases, the unfavorable indication of this sudden blindness is so well established?" Rapidly advancing blindness during pregnancy, with and without albuminuria, has been arrested by the induction of premature labor. Moreover, there is less risk to her life during a premature confinement than in labor, if pregnancy had been permitted to run on until the ninth month. The question is an extremely difficult one. As a rule, the risk, under any circumstances, is considerable, but the dangers to life from convulsions during confinement is greater the longer the birth of the child is delayed. Every week the confinement is postponed, after rapidly-advancing blindness has declared itself, the greater the risk of permanent loss of vision, for the destructive changes in the retina are apt to make sudden, frequently rapid, and irremediable and irrecoverable strides in cases of this kind.

MINUTE.

Four hundred members were present during the day's session.

The Section then adjourned, after passing a vote of thanks to Prof. Simpson for the felicitous and able manner in which he had presided.

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*Secretaries.*

# SECTION V—GYNÆCOLOGY.

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Prof. E. H. Trenholme, M. D., Montreal, Canada.
Dr. Stephen H. Weeks, Portland, Maine.
Dr. William G. Wheeler, Chelsea, Mass.

# FIRST DAY.

The Section met on Monday, September 5th, at 11 A. M., and was called to order by the President, Dr. HENRY O. MARCY, Boston, Mass., who delivered the following

## ADDRESS.

GENTLEMEN OF THE SECTION OF GYNÆCOLOGY :—

I have presumed upon your approval in the omission of a formal introductory address at the opening session of our Section, reserving to myself, instead, the privilege of a more scientific contribution at a later date.

We gather here from our various States, to this, our Capital City, as children visit the paternal home, with mutual pleasure and pride.

Those of you who come to us from other lands will find the profession of our entire country waiting to extend to you the warmest greeting. In their name I esteem it a high honor to receive you.

The cloud which rested over our councils during the earlier period of the preparatory work is happily dispelled, and even this dissension (which at one time seemed so serious) arose, in large measure, from the paramount desire on the part of the profession of America to make this Congress an event in the medical history of our country.

The Executive Committee have spared no effort to make your coming together one of marked pleasure and profit. A glance at our programme will teach that the work of this Section has large representation from the master minds of both continents, men present at the baptismal font of Gynæcology, who have watched and moulded her progress until the present. In the wealth of our long list of contributions we find our chief embarrassment, and I may have to ask your indulgence in debate, as well as profit by your counsel, that all may be served in a spirit of equity and justice.

It seems not invidious, in this relation, to mention the name of Marion Sims, honored by the world, but doubly dear to America, with both pride and sorrow. With pride, since he conferred upon our country the great honor of being recognized as the birthplace of Gynæcology. With sorrow, since, in the fullness of a ripe manhood, he was all too soon taken from us, when we might have hoped his noble presence and eloquent speech would have welcomed you here, rather than poor words of mine. May the memory of his genial presence abide with us, and the earnest spirit in which he sought to know the truth preside over our councils.

This Section of the Ninth International Congress is now open for the commencement of its labors.

Dr. NATHAN ALLEN, Lowell, Mass., contributed a paper on

## THE LAW OF INCREASE.

LA LOI DE L'ACRROISSEMENT.

DAS GESETZ DER VERMEHRUNG.

In the very nature of things, all the organs in the human body must be governed by law. While Anatomy alone cannot teach this law, it is the province of physiology to furnish definite instruction on the subject. It is expected, therefore, that a knowledge of the positions of every organ in the body can be obtained from this science. When their functions are severally performed according to original intent, it may be said they are governed by law, though there may be different degrees in which the law is observed. Thus, while each organ has its own distinct function, such is the connection between one organ and another, that in order to secure the best result, there must be harmony in their action.

My leading object in presenting this paper is to call the special attention of gynæcologists to this subject. If there is a law of human increase, it should certainly interest those making a specialty of the study and treatment of the diseases of woman. If there is such a law, it has a powerful influence upon her organization, whether in a healthy or diseased state. What we mean by this law or its application, is, where not only one organ performs its legitimate functions, but all do so harmoniously, in a normal, healthy manner.

In the study and treatment of the reproductive organs, it would seem that this principle should be kept constantly in view. It may be said health is always the primary object, but might there not be an advantage in taking a higher and broader view—that there must be a normal standard to every organ—one that is better than all others, and upon which this law is based? That there is a difference in the organization of women, with reference to propagation, all experience and observation prove. In what, then, does this difference consist? It is not confined to this or that sexual organ, or to those only in the pelvis; it must depend upon other parts of the body, such as the digestive organs, the mammary glands, etc.

In this line of inquiry, if I relate briefly my own experience and observation, with their results, it may give a clearer and better view of the subject. Soon after commencing medical practice, forty years ago, my attention was arrested by the great difference in the birth rate between the native New England women and the English, the Irish, the Scotch, the Canadian French and the German, my practice calling me among all these classes. The small number of children found in a New England family, compared with what it was fifty or one hundred years before, was also noticed, being on an average only about one-third or one-half as many as formerly. The birth rate of the Irish, English, French and German was found, on an average, about twice as large as that of the strictly native New Englander.

After many years of study and observation, I became convinced that the "arts of prevention and destruction," though frequently practiced, were not sufficient to account for this great difference in birth rate, but that there must be some other primary cause —that there might exist some difference or change in the organization itself to account for it. This inquiry led to a wide range of studies, such as Census and Registration Reports, works on population, Matthews' and other vital statistics, and obstetrics. It also led to a careful observation, in medical practice, of the differences in the physical development of women, and to the peculiarities in the physiology of different races

and nations. As a result of these inquiries and reflections, covering a period of some twenty years, I became thoroughly convinced that nature, or the Creator of all things, has established a great general law of propagation applicable to all organic life.

As applied to human beings it may be defined as follows: This law is based upon a normal or perfect standard of the human system, where every organ of the body is complete in structure, and performs fully all its natural functions. This principle implies that the body is symmetrical and well developed in all its parts, so that each organ acts in harmony with all the others. According to this principle the nearer the organization approaches that standard, and the more strictly the laws of propagation are observed, the greater will be the number of children, and the better their constitutions for securing the great objects of life. On the other hand, if the organization is carried to an extreme development in either direction, viz.: a predominance of nerve tissue or of a low animal nature, the tendency in such families or races is gradually to decrease, and ultimately to become extinct. Thus people enjoying the highest state of civilization and refinement, or those sunk in the lowest state of barbarism, do not multiply rapidly.

This law of increase is strictly the normal standard of physiology, upon which other important principles are based. It is the standard of perfect health. In deviations from it are found weaknesses, diseases and the abnormal classes, such as the blind, the deaf and dumb, the feeble-minded, and the predispositions that lead to insanity. This standard furnishes also the true law of longevity, as well as of health. By means of this law of propagation, other physiological problems are solved, such as the intermarriage of relations, and its effects; it also furnishes a standard upon which heredity, in all its bearings, will find a basis and explanation. It furnishes a standard or model of beauty of the human form, sought after and admired by the Greeks as well as other refined and cultivated people.

In a work so important as the continuance of the race, there must be, in the very nature of things, some law or standard to guide us in the best way. If we examine the organization of woman, as a whole, or each organ by itself, wherein or how can a law of increase apply? In cases of barrenness and sterility, it can surely have no application. Neither can it find much support where weaknesses or diseases exist in the sexual organs. In case there is such a law, its operation should favor health and not produce disease. In structure and design, is it not intended that woman should be fruitful and multiply? Has not the fact been established, on a large scale, that women having families enjoy better health and live longer than those having no offspring? Such a test was applied, we believe, in Scotland, and found successful. In the process of child-bearing, what are the most important points or surest tests of success or failure? Should we not say *the pregnant state, parturition* or *delivery, the qualifications of a nurse* and *the character of offspring?* Now what do the indications under each one of these changes teach in reference to a law of increase, and upon what kind of organization is it based? The changes caused by the pregnant state are various—some slight, some very troublesome, but rarely dangerous. Where are these the least; what is the type of organization? It is a healthy well-balanced organization. We have known women go through this whole process with scarcely any unpleasant effects, whereas others suffered most seriously. But in the latter case, there were weak points, defects in certain organs, a want of balance, a predominance of nerve tissue, etc.

In the matter of delivery or labor, there are most surprising differences in women. Where are the difficulties attending this process the slightest and safest, as a whole? We shall find it in those constitutions most healthy, but balanced in every organ and approaching nearest a normal standard of physiology. On the other hand, these difficulties are found the greatest and most dangerous in an opposite organization from the one here described.

What shall we say of the qualities to nurse? The women of some nationalities can generally furnish a good supply of milk to their offspring, while in others there is a meagre development of the mammary glands. It is estimated by good judges that not half the New England women can, at the present day, properly nurse their offspring. Then, in applying this law of increase to infant life, healthy and promising, where do we find it? Is it not from the sound, healthy and well-balanced organization of mothers? This requires no argument. This is a question of vital importance to human welfare. But the subject is too large and complicated for discussion here. Questions only can be raised and suggestions made. A short article is a poor apology where volumes should be occupied. Of all others, gynæcologists should investigate this subject, and if there are laws which govern propagation, these should certainly be understood. The writer sincerely hopes that some earnest cultivators of gynæcology will enter this field of study, and, it may be, bring out new truths or doctrines which will become invaluable.

Should any one wish to consult the Papers of the writer on this subject, the following references are given:—

*The Quarterly Journal of Psychological Medicine*, published by the Appletons, New York, April, 1868; an article on the Law of Human Increase; and April, 1869, an article on Intermarriage of Relations.

*Transactions of the American Medical Association* for 1870; a paper on the Physiological Laws of Human Increase.

*The American Journal of Obstetrics and Diseases of Women and Children*, published by Wood & Co., New York, for 1876; an article on the Normal Standard of Woman for Propagation.

*The Popular Science Monthly*, for November, 1882, published by the Appletons, New York; an article on The Law of Human Increase.

[From a misunderstanding between the President of the Section on Gynæcology and the writer, he was not expecting to prepare such a paper as would be suggested by the above Title, till within a few days of the time of publication. All that he has here attempted is to present a few suggestions and thoughts on the subject.]

# THE GRADUAL PREPARATORY TREATMENT OF THE COMPLICATIONS OF URINARY AND FECAL FISTULÆ IN WOMEN, INCLUDING A SPECIAL CONSIDERATION OF THE TREATMENT OF PYELITIS BY A NEW METHOD, AND THE PREVENTION OF THE EVILS OF INCONTINENCY OF THE URINE BY A NEW SYSTEM OF DRAINAGE.

## LE TRAITEMENT PRÉPARATOIRE GRADUEL DES COMPLICATIONS DE FISTULES URINAIRES ET FÉCALES, COMPRENANT UNE CONSIDÉRATION SPÉCIALE DU TRAITEMENT DE LA PYÉLITE PAR UNE NOUVELLE MÉTHODE, ET LA PRÉVENTION DES MAUX D'INCONTINENCE D'URINE PAR UN NOUVEAU SYSTEME D'ÉGOUTTAGE.

## DIE GRADUELLE VORBEREITENDE BEHANDLUNG VON COMPLICATIONEN DER BLASEN- UND DARMFISTELN BEI FRAUEN, MIT EINSCHLUSS EINER SPECIELLEN BETRACHTUNG ÜBER DIE BEHANDLUNG DER PYELITIS, UND DIE VERHINDERUNG DER ÜBEL EINER INCONTINENTIA URINÆ DURCH EINE NEUE METHODE DER DRAINAGE.

BY NATHAN BOZEMAN, M. D.,

Of New York; Surgeon to the Woman's Hospital of the State of New York.

### SECTION I.—HISTORY.

Cicatricial contraction of the vagina was recognized as a complication of urinary fistula, and as one of the causes of sterility, by the early Grecian and Roman writers, and, judging from several forms of hard pessaries figured in the works of authors soon after the revival of literature, considerable advance had been made at this latter period in the treatment of this condition, when not associated with fistula, by dilatation of the vagina. But it was not until long afterward, when the knowledge of the anatomy of the structures involved and the resources of surgery had increased, that the treatment of vesico-vaginal fistula became a matter of interest. After the curability of some forms of the malady had been demonstrated by Jobert de Lamballe* to the Academy of Medicine in Paris, in 1837, the attention of the profession was at length aroused, and the complications of fistulæ, in so far as they interfered with the performance of the operation for the closure of the opening into the bladder, began to be treated by incisions in an imperfect manner. Jobert divided, at the time of the operation, such prominent bands as hid the fistulous opening from view, and afterward, to increase the mobility of the borders, made parallel incisions in the mucous membrane along the margins of the fistula, and finally extended the method to what has been known as "Jobert's cut."†

The next advance was made by Mettauer, in the United States.‡ In July, 1847, he reported a case of urethro-vesico-vaginal fistula, in which the vagina was contracted to the size of the little finger. The distortion of the vagina was treated by "dissecting down the adhesions, dividing such bands and contractions as existed, and dilating the passage thus liberated with sponge tents." His first attempt to close the fistula was made three months later, but failed. The operation was repeated at intervals of six months, for four years, and was finally unsuccessful, and the case abandoned. In a second paper, published in June, 1855,§ eight years after the appearance of the first,

* *Bulletin de l'Academie de Médecine*, Seance du 27 Mars 1838, t. ii, page 582.

† "*Traité de Chirurgie Plastique*," Tome ii, 1849, and *Traité des Fistules*, etc., 1852.

‡ *Am. Jour. Medical Sciences*, vol. xiv, p. 119, 1847.

§ *Virginia Med. and Surgical Journal* for June, and *Southern Med. and Surg. Journal*, vol. vii, p. 417, 1855.

in speaking of contractions of the vagina, he says: "In all of the cases in which I have met with them, three in number, they serve to embarrass the operation by rendering the fistula more or less inaccessible. They should, invariably, be corrected before attempting the operation for the fistula; and for the purpose it will generally be sufficient, either to dilate the vagina with graduated tents of sponge covered with oil-silk, commencing with the smallest, or by cautiously dividing the bands causing the contractions and then dilating them with tents. I have employed both these methods with entire success." This is all that Mettauer ever wrote upon this subject, and as neither of his papers attracted much attention at the time, they did not come to my notice until long afterward.

From a study of the above extracts, it will be seen that Mettauer's experience was small, having applied the treatment to three cases only, and that his conception of the ends to be gained, and the bearing of this complication on the treatment of fistula, was limited. He regarded the contraction of the vagina as merely "embarrassing the operation, by rendering the fistula more or less inaccessible," and he carried the section of the bands and dilation of the vagina only so far as to render the exposure of the fistula and the subsequent steps of the operation for its closure more easy. This is all of importance that I have been able to find, by a diligent search through the literature of the subject of vesico-vaginal fistula, concerning the treatment of cicatricial contractions of the vagina, previous to my first paper reporting a case.

In February, 1855, without any knowledge of Mettauer's first paper, and previous to the publication of his second, I encountered a case of fistula, complicated by contraction of the vagina, which I treated by incision of the bands and subsequent gradual dilation with oil-silk-covered sponge dilators. In May of the same year I treated a second case in a similar manner. The first case was reported in *The New Orleans Medical and Surgical Journal*, January, 1860, the second in *The Louisville Review*, May, 1856, but as the numbers of these journals are out of print, and, therefore, not easily referred to, and as the cases are of considerable interest and deserving of a wider circulation, I will give a brief account of them here:—

CASE I.—Matilda Stamper (colored); aged 21; consulted me February 9th, 1855. Examination disclosed the existence of three fistulous openings, one into the urethra and two into the bladder. The vagina, through which constantly flowed ammoniacal urine, was contracted to the size of the index finger. Fig. 1 is a fairly accurate representation of the lesions present.

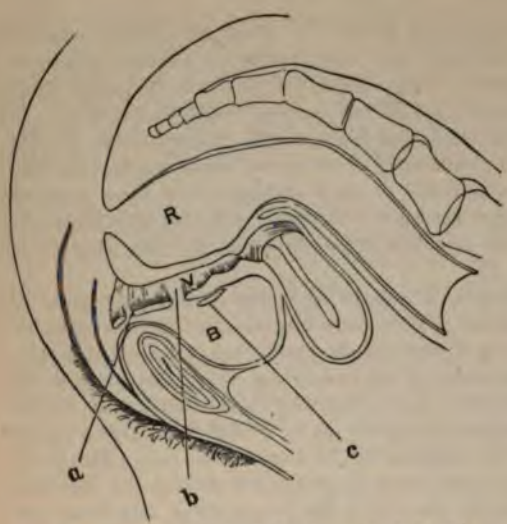
In describing the treatment of the case, I said: "As a preparatory measure for the operation, I had to make deep incisions in the contracting bands of the vagina and then to dilate the organ by means of tents." By tents I meant the instruments which I now call vulvo-vaginal sponge dilators (Fig. 20, page 531). The vagina having been sufficiently dilated (Fig. 2), one of the openings was closed by means of the clamp-suture of Dr. Sims.* The operation failed because the borders of the fistula containing the sutures sloughed away, in consequence of the action of ammoniacal urine and the pressure exerted by the clamps. My experience in this case led me, a few months later, to devise the button suture, in order to protect the line of coaptation from contact with ammoniacal urine.

CASE II.—Kitty Johnson (colored), aged 18, was sent to me May 24th, 1855. Examination disclosed the presence of two fistulous openings separated by a contraction of the vagina. The lower fistula was readily accessible, but the upper, as shown in Fig. 3, involved the cervix uteri, and communicated with the lower part of the vagina only by a long narrow opening. On June 12th I closed the lower fistula with my button suture.† The operation was completely successful, although the vagina was con-

* *Am. Journ. Med. Sciences*, Jan., 1852.

† *Op. cit.*, 1856.

FIG. 1.




Lesions present in Case I. *a*. Urethro-vaginal fistula. *b*. Urethro-vesico-vaginal fistula. *c*. Vesico-vaginal fistula. R. Rectum. V. Vagina. B. Bladder.

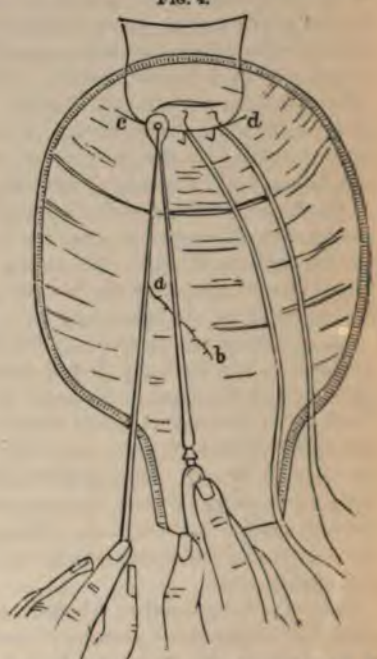
FIG. 2.

Result of treatment. *a b*. Clamp suture, which had sloughed out.

FIG. 3.

Lesions present in Case II. *a*, cicatricial contraction of the vagina. *b*, fistulous opening. The lower fistula is hidden by the button. *c*, transverse section of button.

FIG. 4.




Result of treatment. *a b*, line of union of lower fistula. *d*, borders of the fistulous opening above, coaptated. The figure also shows my original suture adjuster and method of shouldering the wires, by which I was enabled to discard the "clamp suture," a modification of the quill, devised and used by Dr. Sims for thirteen months after this time (Silver Sutures in Surgery, Nov. 17th, 1857), and to employ the interrupted suture, combined with a leaden button, as Fig. 3 illustrates.

stantly filled with ammoniacal urine, and a high grade of vaginitis was present. This was the second case in which I used my new form of suture. A few weeks later "I made preparation by breaking up the morbid adhesions between the two walls of the vagina, in order to expose the fistulous opening above. To prevent reunion of the parts, a bag of oil silk (Fig. 21, page 531), stuffed with bits of sponge, was introduced into the vagina." By this means I was able to dilate the vagina (Fig. 4), and in the course of a few weeks closed the second fistula at a single operation, using my button suture.

Ever since my experience with these two cases, in 1855, I have continued to use and to attach great value to a system of gradual preparatory treatment, by which the difficulties of the operation for the closure of fistulous openings have been very materially lessened, and it has formed a prominent feature in my methods. In 1858 I introduced my mode of treating cicatricial contractions of the vagina into England (St. Mary's and University College Hospitals, London), and afterwards, in 1874–5 and 6 into Germany,* Austria † and France.‡ According to the records of the institution, corroborated by the testimony of Dr. Emmet, it was first employed in a modified form in the Woman's Hospital of New York, in January, 1859.

Being more fortunate in my early labors than Mettauer, in combining with a method of treating this complication a still more important element of success, a perfect form of suture, I was able to enlarge my experience, which, instead of being limited to two cases, rapidly extended to more than forty.§ I was thus enabled to modify and to perfect the method, to extend its application, and by final success instead of failure in closing the fistulous openings, to cause its adoption by others. Besides, quickly and independently arriving at the point where Mettauer ended, I soon saw that all that was necessary was not yet gained, and that the existence of bands and contractions of the vagina militated against success in other and important respects, besides "rendering the fistulæ inaccessible" and "embarrassing" operative procedures. I recognized that by exerting traction they prevented apposition of the borders of the fistula, and to overcome this difficulty much greater dilatation of the vagina must be secured. I also soon appreciated a new principle, that if the loss of tissue was great, the uterus, when fixed, must be made movable, so as to allow its descent in the pelvis, so that the cervix might be made, by means of my form of suture, subservient to the closure of the fistula. (Fig. 5.)

In concluding this short historical sketch, and in introduction to what follows, it is proper to state that in the course of my experience in the treatment of urinary and fecal fistulæ, as I encountered new difficulties, I have described, from time to time, the cases, and the means by which I endeavored to overcome them; but all, especially the more recent of my results, have not been published. The object of this paper is, therefore, to set these latter before the profession, and to combine them with what I have already written. In this way, I hope to communicate, in a more systematic manner, the results of my experience and observations in the treatment of the complications of fistula, which have extended over a period of thirty-four years. The object of my method of treatment, preparatory to the performance of the operation for the closure of

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* Simon—*Wiener Med. Wochenschrift* (No. 27–32, 1876). Bozeman—*Richmond and Louisville Med. Journ.* (Oct., 1877).

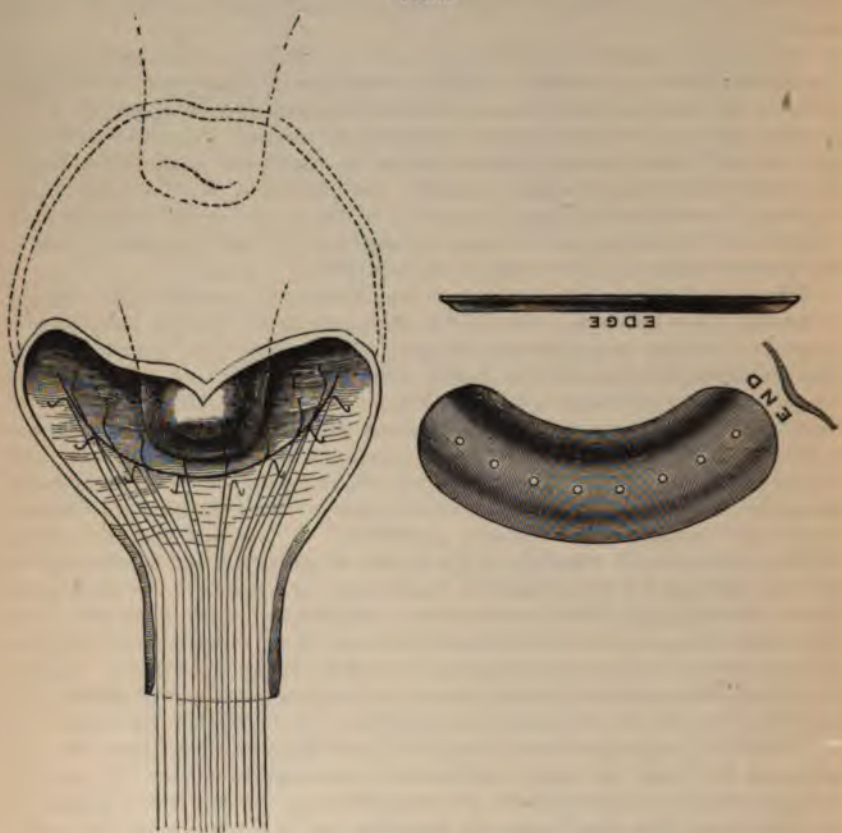
† Bandl—*Wiener Med. Wochenschrift* (1875–1877–1882). Massari—*Wiener Med. Wochenschrift* (No. 25, 26, 1878). Pawlik—*Zeitschrift für Geburtskunde* (Vol. viii, p. 22, 1882).

‡ Paul Berger—*La France Médicale* (May, 1876). Bozeman—*La France Médicale* (June, 1876). See also Hergott—*Annales de Gynecologie*, Sept. and Oct., 1884.

§ *Louisville Review*, May, 1856. *North American Med.-Chir. Review*, July and November, 1857. *New Orleans Med. and Surg. Journ.*, January, March and May, 1860.

a fistulous opening, is to overcome and prevent the injurious effects of incontinence of urine, and to remedy the complicating injuries and diseases of all the organs involved. In other words, to remove, as far as possible, the obstacles in the way of the easy performance and success of the final operation, and to cause the diseased tissues to return

FIG. 5.




A case which I cured at a single operation, July 12th, 1856, by dragging down the uterus and making it subservient to the closure of a large fistulous opening, thus obviating the necessity of "Jobert's cut." (Copied from Fig. 5, Case viii, *North American Med.-Chir. Review* for July and November, 1857.) The borders of the fistula are shown coaptated throughout their entire length with my suture adjuster, ready for the adjustment of the button, and held in apposition simply by the shouldering of the coarse wire employed. Three views of the button used in this case are also presented.

to a state of health, so that not only will the incontinence of urine be cured, but the functions of all the organs be preserved.

SECTION II.—THE TREATMENT AND THE PREVENTION OF THE EFFECTS OF INCONTINENCE OF URINE.

The well known and most important effect of the diversion of the urine by a fistulous opening, from its natural receptacle, the bladder, into the vagina, is incontinence of

urine. The urine consequently comes in contact with the integument and a mucous membrane not suited to withstand its irritating action. When it becomes ammoniacal, as frequently happens, the sufferings of the patient are very great. An intense urinous odor pervades the atmosphere which she breathes, and even the dwelling which she inhabits. The irritant action of the urine is then not only sufficient to cause vaginitis and a dermatitis, with intolerable itching of the vulva, mons veneris and buttocks, but may cause deep ulcerations of these parts. The distress of the patient is still further increased by the deposits of the earthy salts in the vagina and among the hairs which cover the external genitals.

In a case of this kind much can be done by cleanliness. The external parts should be frequently bathed, a sitz-bath being useful for this purpose. A vaginal douche of warm water should also be employed at short intervals. If necessary, to prevent incrustations the hair may be shaved from the pubes and the perineum. In most cases, however, it is usually possible, by cleanliness alone, to remove the salts of lime and to allay, to a considerable extent, the itching, soreness and inflammation. Applications of vaseline or slightly astringent ointments, *e. g.*, oxide of zinc, are useful. When ulcers are present they should be touched with nitrate of silver, twelve per cent. solution, once in twenty-four hours.

By the diligent use of these means it is usually possible to palliate the sufferings of the patient, and to prepare the parts for examination and the employment of more radical measures. In some cases, however, it is not possible, and in others it is not desirable to close the fistulous opening. The general condition of the patient may make delay desirable, or the requisite skill and appliances may not be at hand; cystitis or inflammation of the uterus and pelvis of the kidney may be present, and time must be consumed in treating these complications; the nature of the injury to the septum or the urethra may be such as to prevent successful closure of the opening. In still another class of cases, now rapidly growing larger, cystotomy has been done, and the opening has been allowed to remain in order to drain the bladder for the cure of cystitis. And, finally, an artificial fistula, as I shall hereafter show, may be made in order to expose the orifices of the ureters, and to treat diseases of the pelvis of the kidney. In all these cases the patient must be subjected for a long period to the distressing effects of incontinence of urine. It is, therefore, an object of the utmost importance to possess an instrument by which the urine can be drained from the bladder and its injurious effects avoided. For many years I have given this subject much thought, and, at intervals, have tried experiments, but not until recently have I met with a great degree of success. Now I feel that I can confidently claim that I have solved the problem.

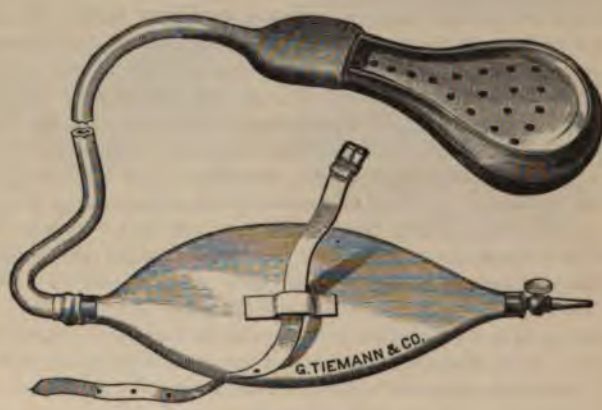
The instrument shown in Fig. 6 is the form best adapted for drainage in all positions of the body, and I have called it a utero-vesical drainage support.* It may be made of brass, silver-plated, German silver, hard rubber, or better still, when the patient can afford it, of silver. The instrument is of a cordate or pyriform shape, resembling, to a certain extent, the uterus in form, and may be described as consisting of a body and neck Its inferior surface is rounded and rests in contact with the posterior vaginal wall. The upper surface of the body, which supports the cervix uteri and conforms to the vesico-vaginal septum, presents a broad, shallow concavity or dish, which is continued forward on the neck of the instrument for about one-half of its length, in the form of a broad groove. In the bottom of the dish and groove are twenty

* In connecting the idea of support with drainage, I am conscious of introducing something foreign to the original design of the instrument, but experience has shown me that it serves a useful purpose in supporting a retroverted uterus when retroversion accompanies fistula. The name is also appropriate, because the instrument supports the anterior wall of the vagina and the fundus of the bladder, when the latter is prolapsed.

perforations, made of considerable size, in order to prevent clogging by mucus and menstrual blood. The positions of these openings is of importance; they should not be made in the posterior part of the dish, but all should be situated anterior to the transverse diameter of the body, or three-quarters of an inch in front of the posterior border of the concave upper surface of the instrument. The neck is thinner than the body and curves backward, forming an arc of a circle having a diameter of about two inches. The extremity of the neck presents a round opening which leads into the cavity of the interior of the instrument and allows the escape of the urine. The posterior extremity of the instrument is broad and rounded, and occupies the fornix of the vagina behind the cervix-uteri. A flexible rubber tube fits over the neck and connects with a rubber bag, which is buckled to the thigh, near the knee. At the point where the tube joins the bag is a valve, which prevents the return of the urine when the limb is elevated. The lower extremity of the urinal is fitted with a stopcock, so as to allow it to be emptied when necessary.

The instrument drains better in a sitting and upright position than in the recumbent

Fig. 6.




Utero-vesical Drainage Support.

*Dimensions of the Instrument.*—Entire length, four inches; length of body, two inches; width of body, two inches; thickness of body, three-quarters of an inch; length of dish, three inches; superficial area of dish, four square inches.

posture; but in most cases the small amount of urine lost when lying down is considered by the patient a matter of slight importance and causes but little inconvenience. When, however, the vagina is excessively voluminous and its walls are prolapsed, or the perineum is lost or badly lacerated, the instrument is retained in place with difficulty. In order to adapt the system of drainage to these cases, and more satisfactorily to the recumbent position when the patient is confined to bed from any cause for a long period, I employ a somewhat different form of instrument, which I have called a utero-vesico-urethral drainage support (Fig. 7).

This instrument is much longer and larger than the one first described. The increase in length is principally in the neck, which is also made much thicker, in order to fill the mouth of the vagina. It terminates in a conical, beak-like extremity or nozzle, which projects outside of the vagina and rests against the perineum. It is possible

to use this instrument in the recumbent posture by simply allowing the urine to drain from the nozzle into some convenient vessel, but usually it is better to attach the tube and urinal, which may lie in the bed or on a chair. As has already been said, this form of the instrument is adapted to the recumbent, and in a less degree to the upright position. It cannot be used with comfort to the patient when she sits, on account of its length.

To explain exactly how and why the urine always finds its way into the perforations in the instrument, sometimes apparently contrary to the law of gravitation, has been a problem of great interest to me, and is still not entirely clear to my mind. The explanation that seems most probable is that it is due to the perfect adaptation of the vaginal walls to the entire surface of the instrument, except at the point where they are deficient, that is, at the fistulous opening. The closeness of contact of the mucous membrane with the instrument is probably increased by the atmospheric pressure and perhaps by contractions of the muscular fibres of the vagina and perineum. Its upper surface conforming exactly in size and shape with the vesico-vaginal septum, the fistulous opening must come in apposition with this part of the instrument. The accurate contact of the mucous membrane preventing its egress in any other direction, the urine finds its way through some one of the perforations, and thence through the tube into

FIG. 7.

Utero-vesico-urethral Drainage Support.

*Measurements.*—Entire length of the instrument, 7½ inches. Body, transverse measurement, 2⅕ inches. Body, length, 2⅕ inches. Neck, length, 2½ inches. Neck, width, 1½ inches. Nozzle, from the extremity of groove on the upper surface of the instrument to the end of nozzle, 2½ inches.

the urinal (see Fig. 8). The principle of the siphon also comes into play to some extent, especially when the patient is in the upright position. As the instrument fills and empties, a partial vacuum is produced and an aspirating force is exerted which tends to draw the urine through the perforations.

In some cases the use of the instrument is prevented by atresia and distortion of the vagina. These complications should first be treated in the manner presently to be described. Great tenderness and irritability of the vagina, due to the action of the urine, may render the introduction of the drain painful, and should be allayed by the use of douches and other measures already mentioned. When these difficulties have been overcome, either of the forms of the instrument can be introduced and removed by the patient whenever necessary, without difficulty, and remain in place in virtue of their form, without the aid of a T bandage. They are small, simple, free from angles and sharp borders, are readily kept clean, cause no discomfort or irritation of the vagina and do not press upon the rectum or bladder, nor interfere with locomotion. While possessing all these qualities they collect the urine and conduct it away with a degree of perfection, that to the patient is a constant cause of wonder and delight. I have now five cases in which the different forms of the instrument are in use. In one of

them there is entire destruction of the urethra. In all the instrument functions factorily. Frequently, patients with urinary fistula come to my office after l traveled long distances, and when the instrument has not been touched for hou I find the linen and the skin of the perineum and neighboring parts almost pe dry.*

FIG. 8.

Utero-vesical Drainage Support in place. (Diagrammatic section in dorsal position, ¼ size

The openings in the upper surface of the instrument are shown cut longitudinally. The fistulou ing is seen immediately below the letter *a*, in section. The dotted triangle indicates that the axi instrument makes an angle of about 35° with the horizon when the patient is lying down. Th must, therefore, collect in the instrument and the bladder until it rises to the level of the pe It is prevented from escaping into the vagina by the intimacy of contact of the mucous me with the instrument.

SECTION III.—THE TREATMENT OF THE COMPLICATIONS OF URINARY AND FISTULÆ.

Having, by the means already described, overcome or prevented the inflam and tenderness of the vagina and surrounding parts, due to the contact of urine,

* The instrument drains not only the urine but the menstrual blood and the uterine disc Although I have not yet had the opportunity to make the experiment, I believe that the vesico-urethral form could be used with great advantage after labor, at the time when the f opening was formed. It would prevent the contact of the urine and lochial discharges w granulating surfaces of the injuries of the vagina. The healing process would be car more rapidly and with the formation of less cicatricial material, and adhesions between th of the vagina would be prevented by its use. The instrument may also be used to dr lochial discharges in cases of puerperal septicæmia, and might be combined with irrigatio vagina. In cancer of the cervix uteri benefit would probably result from its employm lessening the discomfort and the injurious effects of an abundant and fetid discharge. opening had been formed in the bladder, by drawing away the urine, it would relieve distressing symptom.

fectly simple cases we may at once proceed to close the fistula. But, unfortunately, very few fistulæ the result of difficult labor are perfectly simple. The same cause, the pressure of the child's head, which produces the perforation of the vesical or rectal wall, injures to a greater or less extent other parts of the vagina, and frequently the uterus, ureters and urethra. These injuries, and the distortions of the structures involved, the result of the contraction of the cicatricial material produced in the healing process, constitute the most frequent complications. In the worst cases, to them are added subsequent disease of the injured organs and the bladder, and fixation of the uterus, following puerperal cellulitis and peritonitis.

*Cicatricial Contractions and Distortions of the Vagina.*—Distortion and diminution or obliteration of the calibre of the vagina result, either from adhesions which take place between its surfaces or from the contraction of cicatricial material produced in the slow healing, by granulation, of deep ulceration of its walls. As a rule the injury to the vagina is greatest at its cervical and pubic portions, and it is therefore in these situations that the change in its form is most frequent and the greatest. The sloughing of the vagina also takes place in planes corresponding to the greatest circumference of the child's head, and the resulting contractions have an annular form. The cicatricial tissue frequently projects prominently above the surrounding mucous membrane as hard bands and bridles. Sometimes we find these bands radiating in all directions from the fistula, separating widely and fixing its borders; at others the vagina, and in consequence of the distortion of the septum, the base of the bladder, are divided by them into a series of cavities or pouches in which the urine remains for long periods, putrefies and causes inflammation and ulceration of the mucous membrane.

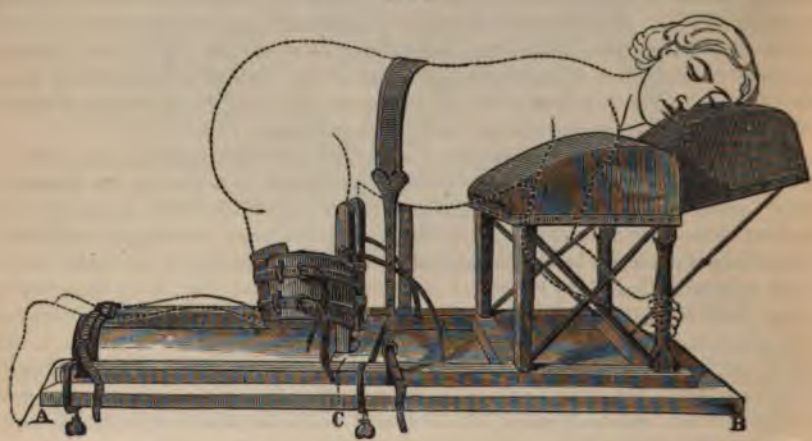
The relation which these pathological changes bear to the treatment of fistula is most important. The vagina may be so much contracted as to prevent the introduction of instruments and the exposure of the fistulous opening, and to make the performance of the operation difficult or impossible. Furthermore, and equally important, the presence of cicatricial bands and general thickening and rigidity of the vaginal walls oppose approximation of the borders of the fistula. In these cases, if by the exertion of great force the edges are brought in contact, the sutures cut out and the operation fails. It is, therefore, of the greatest importance to overcome these obstacles in the way of the success of the operation, to distend and soften the vagina, and to secure, as far as possible, the perfect relaxation of its walls. The means which I employ to accomplish these results are mainly the section of bands and masses of cicatricial material, separation of adherent surfaces and the gradual distention of the contractions by means of dilating instruments. In cases where the vagina is very much contracted my method consists, first, in the division of all the prominent bands, and, if necessary, in dissecting adhesions, especially such as lie near the vaginal orifice, at a primary operation, so as to give the vagina a regular cylindrical form and to increase its dimensions to an extent sufficient to allow the introduction of my smallest vulvo-vaginal dilator. Afterward, as the dilation proceeds and larger and larger instruments are used, I cut such bands, at frequent intervals, as become prominent, and make more delicate dissections of such adhesions as are situated high up in the cervical portion of the vaginal canal.

The details of the primary operation, and the instruments employed, are of importance. As a rule an anæsthetic is necessary. When the orifice of the vagina is too small to admit any form of speculum, the patient should be placed in the lithotomy position and the finger inserted in the rectum so as to guard against injury of that organ. When the contraction of the vagina is less great, or is situated high up, I employ the knee-chest position in conjunction with my supporting apparatus (Fig. 9), which restrains the movements of the patient and makes the administration of an

anæsthetic possible.* I prefer this position because in it the pelvic viscera fall forward and the greatest distention of the vagina is secured, and because, having the body straight before me, the normal relations of the bladder and rectum to the vagina are less likely to become confused in my mind, than when the patient's body is twisted, as in the lateral prone position. The objections to the latter position seem to me very much the same as would obtain in its use for the lateral operation for stone.

By simply lifting up the perineum, the gravitation of the pelvic viscera forward and the pressure of the atmosphere become sufficient to distend a normal vagina and to bring the cervix uteri into view. But this is not true when distortion of the organ, the result of cicatricial contraction, exists, and something more is needed. The use of a speculum in these cases is twofold: first, to explore the vagina, and secondly, to put the bands on the stretch so as to make them tense and prominent, in order to facilitate their division. Since 1867† I have used my dilating speculum (made of steel, by George Tiemann & Co.), Fig. 10, which has many advantages. It dilates bilaterally the vaginal canal throughout its entire length, at the orifice as well as in the cervical portion. Greater

FIG. 9.




Supporting Apparatus for long operations and Anæsthesia in the Knee-chest position.

space is, therefore, afforded, and the light admitted more freely. The divergence of the blades, being greatest at their extremities, is exactly proportional to the dimensions of the canal, and the adaptation of them to the vagina is secured by their spoon shape and appropriate width and curvature. The blades being placed laterally, the interval left between them above and below corresponds somewhat in shape with the recto- and vesico-vaginal septa; the anterior and posterior walls of the vagina are thus left uncovered, and the bands, in these situations, free to be divided. The most important advantage is the power, perfectly under the control of the surgeon, of distending the bands exactly to the necessary degree to make them tense and prominent for division.

The force of the thumb-screw, being transmitted by long, slender arms, the pressure

* The *New York Medical Record*, January 1st, 1868. † Op. Cit.

FIG. 10.

FIG. 11.

FIG. 10.—Dilating speculum—two-thirds size—Anterior view, showing the intra-vaginal portions of the instrument. The external portion, consisting of the mechanism by which the power is applied, and the curved, elastic arms connecting it with the blades, seen here imperfectly in the background, is better shown in Fig. 36, page 549, where the instrument is represented in use. The blades in the figure are fully expanded, and their spoon shape and appropriate curvature, adapting them to the lateral walls of the vagina, are shown. Projecting inward, from the outer extremities of the blades, are seen two arches which support the perineum, and, extending outward from the same part, are two flaring expansions, or wings, which serve to elevate and support the buttocks.

*A*. Pivot which unites the two lateral halves of the instrument, and through which passes a thumb-screw, by means of which the power is applied. *B*. A second pivot, connected with the extremity of the thumb-screw, and uniting two small, transverse bars, which serve to transmit the power from the screw to the arms of the blades. When the instrument is closed, these bars make an angle with each other.

FIG. 11.—Perineal elevators and adjustable handle, to be used in conjunction with the dilating speculum, or without it.

FIG. 12.

Vaginal Depressor.

FIG. 13.

Uterine forceps.

exerted by the blades is elastic and adapts itself to the varying dimensions of the vagina. All danger of injury from undue distention is thus prevented. The instrument is self-retaining and may be employed alone, but greater expansion of the vagina is secured by using it with a perineal elevator (Fig. 11). My vaginal depressor (Fig. 12) is also useful in exposing and steadying bands, and my uterine forceps (Fig. 13) may be employed as a sponge-holder during the operation, and in the course of the after-treatment, to make applications.*

I divide the bands with the sharp and probe-pointed scalpels, with long handles, shown in Fig. 14. For the more delicate work, and when the cicatricial tissue is situated in positions difficult of access, I use the knife shown in the same figure, the blade of which resembles a gum lancet. Its peculiar shape and the angles that it makes with the handle enables me to bring its sharp cutting edge in contact with bands which, while distinctly felt, are hidden from view.†

In the performance of the operation, care should be taken to avoid wounding the ureters, urethra, bladder or rectum, and if the posterior cul-de-sac of the vagina is reached, the relation which it bears to the peritoneum should be remembered. When

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* I devised my dilating speculum in 1867, in order to overcome a difficulty of another kind. It was made to distend a voluminous vagina where the folds of the mucous membrane enveloped a small fistulous opening.

To those who are not familiar with the instrument, an explanation of its mechanism may be of interest. The power is applied between the fulcrum A (Fig. 10), or the joint which unites the lateral halves of the instrument, and the blades, or intra-vaginal portions, where the resistance is overcome. The two levers employed belong, therefore, to the third class. The power which the instrument possesses of distending bilaterally the orifice, as well as the interior of the canal, depends upon the fact that the fulcrum A is situated in a vertical plane posterior to the ostium vaginæ. In order to prevent obstruction of the line of vision, the joint is also placed, when the instrument is in position, by an anterior curve of the arms of the blades, in the same horizontal plane as the mons veneris. This instrument was the first, and is, so far as I know, the only, speculum in which the levers are of the third class. The earlier dilating instruments of the present century consisted of two or more levers of the first class. The fulcrum was situated near, and in the ruder ones, at, the vaginal orifice. In consequence of this arrangement there was little divergence of the blades at the ostium vaginæ, and the view was more or less obstructed by the joint. The more recent dilating specula are modifications of these old instruments, and, like them, consist of levers of the first class, but differ from them in that each blade moves on a separate fulcrum, which is placed laterally, and, in some instances, is adjustable, in others, fixed in one position. By this change, some dilatation of the vaginal orifice is secured, but the instruments are bulky, ill-adapted to the exploration of the vagina, and the power is applied at such a disadvantage as to render them almost useless for the distention of cicatricial bands.

My speculum is introduced closed, and the blades are then separated by turning the thumb-screw, which passes through a nut at A, and is attached at its extremity to the pivot B, which unites two small, transverse bars. These bars are connected at their distal extremities with the arms of the blades by a joint of the same kind. When the blades are closed, the two bars make an angle with each other. As the pivot B, which is situated at the apex of this angle, is moved forward by the pressure of the thumb-screw, the angle widens out, the distal extremities of the two bars become more widely separated, and the blades to which they are attached open like a pair of sugar tongs. An additional fact about the instrument, the cause of which it is unnecessary to explain, is, as the blades separate, and the resistance offered by the lateral walls of the vagina increases, the power acts at a greater mechanical advantage, and less force is required to turn the thumb-screw. In other words; as the resistance becomes greater, the power is correspondingly increased.

† I have been so particular in the description of these different instruments, because I consider them important in the thorough and easy performance of the primary operation, and because they will be in constant use in the subsequent division of bands and gradual dilatation of the vagina.

the danger of wounding these structures is great it is sometimes better to advance, as is generally possible, in the lower part of the vagina, by tearing with the finger rather than by cutting. In the division of the adhesions and bands it should be also borne in mind that it is desirable to give the vagina, as far as possible, a regular cylindrical shape, to allow the more easy and efficient use of dilators. Too much should not be done at the first operation, because the gain would be afterward lost by the slowness of the healing process and the patient would be exposed to unnecessary danger. It should always be remembered that this operation is but the beginning of the treatment, and without the dilatation to be afterward employed, but little is gained.

Having partially restored the calibre of the vagina, a dilator should be introduced so as to maintain the separation of its walls and of the cut surfaces of the bands and adhesions during the healing process. A suitable instrument for this purpose is a small-sized vulvo-vaginal dilator of hard rubber; or the use of a soft instrument made of bits of sponge covered with oil-silk may be begun at once. Indeed, the latter is preferable, because it causes less pain and does not produce, by pressure, inflammation of the mucous membrane beneath the arch of the pubes. The instrument is retained in place by a T bandage. It should be removed three or four times a day, to allow the use of douches. If the patient suffers much pain opiates may be administered or the hard rubber dilator may be replaced by the soft, but on no account should the dilata-

Fig. 14.

Knives used in dividing adhesions and cicatricial bands.

tion be discontinued, because much that had been gained would then be lost. The healing process is hastened by the application of a solution of nitrate of silver (60 gr. to ℥j) to the granulating surfaces. This should be done at first daily, afterward less frequently. The silver stimulates the granulations, diminishes sensibility, and produces a very superficial eschar which protects the parts beneath from the action of the urine.

At the end of ten days or two weeks the tenderness of the vagina, as a rule, has greatly diminished, and the incisions have so far healed that measures having for their object the greater dilatation of the vagina may be begun. As I have already stated, an extensive operation like the one described is only necessary when the contraction of the vagina is very great. In the milder cases I depend entirely on the method of gradual dilatation and division of the cicatricial material now to be described.

The dilating instruments which I employ are of two kinds, hard and soft, and of two forms, the vulvo-vaginal and intra-vaginal. The hard vulvo-vaginal (Fig. 16), as the name implies, are cylindrical instruments which fill the vagina and project from the vulva, distending the orifice as well as the deeper parts of the canal. The vulval extremity of the instrument is flattened transversely, so as to lie more easily between the folds of the labia, and is prolonged below in a sort of beak, which rests against the

perineum in order to prevent injury to the uterus from too great pressure of its upper extremity. A set of these instruments consists of five sizes, the smallest being thirty millimeters in diameter, the largest fifty. I have had them made, at various times, of German silver, polished wood, aluminum and hard rubber. I much prefer the hard rubber, and my patients consider the red ones, now made by George Tiemann & Co. of New York, less objectionable in color than the black. The hard intra-vaginal dilators, Fig. 15, are made of the same material, and, as the name implies, are intended to be worn entirely inside of the vagina. The lower extremity of these instruments rests on the perineum and the posterior surface of the arch of the pubis, and they are consequently self retaining. My employment of them antedated the use of the vulvo-vaginal instruments. I introduced them, together with my dilating speculum, devised about the same time, into the hospitals of Vienna, Heidelberg and Paris, in 1874–6. The form of intra-vaginal instruments which I commonly employ is a short cylinder ranging from two to three inches in length. The spherical dilator, also shown in Fig. 15, is useful only in exceptional cases, when the vagina is much shortened. The smallest intra-vaginal instrument is thirty millimeters, the largest sixty-five millimeters in diameter, and a full set consists of eight sizes.*

In both of these forms I have recently been able to combine drainage with dilatation.

Fig. 15.

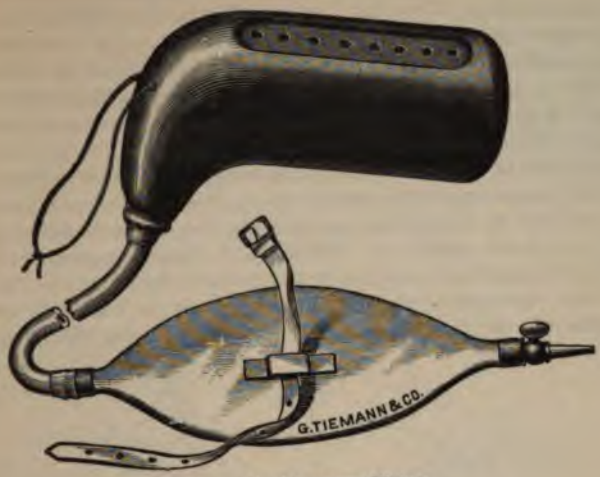
Early forms of intra-vaginal dilators.

In 1878 I made a deep groove along the upper surface of the vulvo-vaginal dilators, as is shown in Fig. 18, in order to prevent pressure on the urethra, and in the hope that urine would flow along it, and be conveyed outside of the vagina; but the contact of the mucous membrane with the instrument was so close as to prevent drainage. Recently, by blocking up the ends of the groove, by making perforations along its course, and connecting the beak by a rubber tube with a urinal, as shown in Fig. 16, I have been able to accomplish this most desirable result. In order to convey away the menstrual blood a small opening is made in the central part of the upper extremity of the instrument, where it lies in contact with the cervix uteri. Corresponding modifications have also been made in the intra-vaginal instrument, as is shown in Fig. 17. In order to indicate the double functions of the improved instruments I have called them drainage dilators. The advantages thus gained will be stated in another connection. It is sufficient to say here that the new forms should entirely replace the old.

The soft dilators are cylindrical bags of oil silk or *taffetas de soie*, firmly packed with

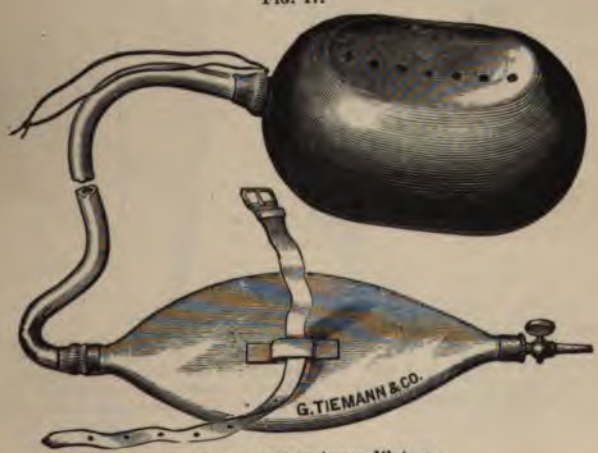
* These instruments are made by Liter & Co. of Vienna, as well as by George Tiemann & Co. of New York.

FIG. 16.




Vulvo-vaginal drainage dilators.

FIG. 17.




Intra-vaginal drainage dilators.

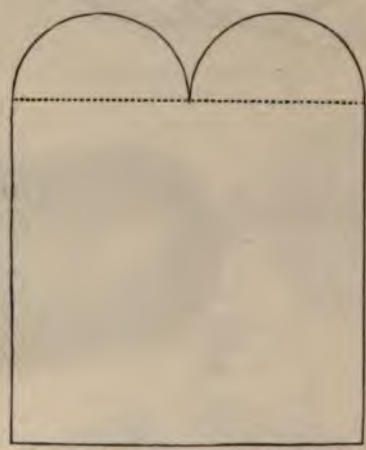
FIG. 18.

Early form of vulvo-vaginal dilator.

a coarse, cheap variety of sponge. The sponge should be torn into bits of a size corresponding to the dimensions of the bag. After having been washed and disinfected it is packed, while moist and soft, piece by piece, into the bag, which is afterward closed by tying its lower extremity with strong twine. The consistency of the dilator should be sufficiently firm to cause the necessary degree of distention of the cicatricial narrowing of the vagina; but the sponge must not be compressed so tightly as to make it impossible to diminish the size of the instrument during its passage through the orifice of the vagina or to prevent absorption of the urine by the sponge when the dilator is in place.

The sizes of the sponge dilators should, as a rule, correspond with the hard instruments; but as they can be made of any diameter, sometimes an advantage is gained by making more minute gradations. The width of a bag corresponding to a dilator of any given diameter may be determined by the following formula; the diameter of the dilator $\times$ 1.57 = the width of the bag. The length of the bags vary, for the vulvo-vaginal dilators (Fig. 20) from ten to twenty, and for the intra-vaginal (Fig. 21) from

Fig. 19.



The shape into which the oil silk should be cut in order to make the bags.

The above diagram is drawn to a scale half the natural size, in order to show the relation between the length and width of a bag for making a dilator thirty millimeters in diameter. The dotted lines on the diameters of the two semicircles forming the upper extremity of the figure.

seven to fifteen centimeters, according as the diameter of the instrument is large or small. Instead of making the bags by sewing together two separate halves, it is better to cut the silk in one piece. The most convenient method is to make a paper pattern having the width of the desired size of bag (determined by the above formula); the silk should then be folded and, allowance having been made for the seam, cut after the pattern in such a manner that when spread out it will have the form shown in Fig. 19. Patients readily learn to make the dilators; but the surgeon must carefully supervise their construction and use. The best results will be obtained when he carries out the details of the treatment with his own hands.

Some skill and practice are required in order to introduce the larger dilators in such a manner as to cause the least discomfort to the patient. The best plan is, first to compress the sponge as much as possible by rolling the bag between the palms of the hands, the fingers being interlocked. The dilator having thus been temporarily diminished in

size, should be lubricated with vaseline, and each portion during introduction, as it engages in the vaginal orifice, should be compressed as much as possible with the fingers. When more than ordinary difficulty is experienced, the perineum may be depressed, and a smooth inclined plane afforded by using the flat blade (Fig. 11) described in connection with my speculum.

Although I have never been able to conduct away the urine absorbed by the sponge by means of a tube, I have long observed the fact that the injurious effects of incontinence were mitigated by the employment of the soft dilators. I found that if the instrument, especially if of large size, were removed every two or three hours and the urine pressed out, the vagina was kept comparatively dry. It is only when the

FIG. 20.

Vulvo-vaginal sponge dilator.

FIG. 21.

Intra-vaginal sponge dilator.

capacity of the sponge for absorption is exceeded that the urine fills and overflows the vagina.

Corresponding to the two forms of dilators, I employ two methods of continuous dilatation, vulvo-vaginal and intra-vaginal, which are applicable to different cases and to the same case at different stages of the treatment. The distinction is based upon the anatomical form of the vagina. Its orifice is fixed by the bony arch of the pubes, and is of comparatively small size, whereas the interior of the canal, especially at its upper extremity, is larger and capable of much greater expansion. Were we restricted to the use of vulvo-vaginal dilation, the maximum amount of distention attainable would be measured by the largest instrument that could be tolerated by the patient at the small and sensitive ostium vaginæ. I have found that this does not, as a rule, exceed fifty

millimetres in diameter. Although fifty millimetres is the limit of vulvo-vaginal distention, the orifice may be temporarily stretched to a much greater degree, and a larger instrument can be introduced and worn in the interior of the vagina. The largest hand intra-vaginal dilator that can be employed in a favorable case I have found to be sixty-five millimetres; but by compressing the sponge a soft instrument seventy millimetres in diameter, or even larger, can be made to pass the orifice. Intra-vaginal dilatation can, therefore, be carried to a much greater extent than vulvo-vaginal. The effect of the latter is to impart to the vagina a cylindrical shape; the former restores the natural form of the organ. Both have their uses, because the intra-vaginal method is not immediately applicable to all cases. When the contraction of the vagina is situated high up, it can be used at once, but when the canal is narrowed to any great extent at an intermediate part or near its orifice, the contraction must be first dilated to a considerable size by vulvo-vaginal dilatation. The reason for the rule is, that the vulvo-vaginal dilators are retained in place by a T bandage, whereas the intra-vaginal instruments rest on the perineum and posterior surface of the symphysis pubis, and are self-retaining. In order that this support may be afforded, it is evident that the calibre of the vagina must exceed that of its orifice. So in many cases the treatment must be begun with vulvo-vaginal and completed with intra-vaginal instruments, the greatest possible distention being attained only by the use of sponge dilators.

Experience in the employment of soft and hard instruments by the two methods just described teaches that both possess certain advantages and defects, which render each kind desirable or prevent its use under certain circumstances. As compared with the hard dilators, the sponge instruments are soft and cause less pain. They can be compressed before and during their passage through the vaginal orifice, and larger instruments can be introduced and greater expansion of the vagina obtained. When in position, the instrument gradually enlarges by imbibition of urine, and exerts an augmented pressure. If, by the primary operation for the section of bands, it is impossible to make the vagina nearly cylindrical, irregularity of the canal is an obstacle to the convenient use of hard dilators, but not of soft. The sponge accommodates itself to all the irregularities of the vagina. It exerts pressure equally in all directions, and those parts of the vaginal canal which contain the least cicatricial tissue, and therefore afford the least resistance, first give way before it. Cicatricial bands are consequently developed or made to stand out prominently above the surrounding mucous membrane, so that they may be divided. Finally, the sponge dilators are especially useful, as will be seen hereafter, in overcoming fixation of the uterus, when it is desirable to draw down the cervix to aid in closing a fistulous opening of large size.

On the other hand, there is more labor involved in the use of the soft instruments, because the sponges, becoming saturated with urine, must be removed at frequent intervals, in order to be washed and disinfected. Another objection to the sponge dilators is, that frequently their use must be discontinued during the menstrual period, on account of their interference with this function. The instrument fitting closely to the cervix opposes the flow of the menstrual blood and may cause discomfort. In a similar manner, when the ureters are exposed in the upper border of the fistula it may close one or both and occasion renal colic.

The chief advantages which the hard instruments possess are, that being smooth they are easily kept clean, and it is possible to combine with them a more nearly perfect system of drainage. The combination of drainage with dilatation is of great utility. The inconvenience and discomfort arising from incontinence of urine are in this way entirely, or to a great extent, removed, and the contact of the urine with the raw surfaces made by the knife in dividing the bands and adhesions is prevented. Healing is consequently more rapid and less cicatricial material is produced in the pro-

cess; the advance made by the division of each band is greater and more permanent, and the complete expansion of the vagina more quickly produced. As the blood is drained away with the urine, there need be no interruption of the treatment during the menstrual period. For these reasons I employ the hard instruments when they do not cause too much pain and the special indications for the use of the sponge dilators, viz., irregularity of the vagina, the development of bands, mobilization of the uterus and the production of great expansion of the vagina, do not exist. The disadvantage of causing pain applies especially to the vulvo-vaginal instrument. In cases where the perineum is hard and unyielding, from the presence in it of much cicatricial tissue, the upward pressure exerted by the dilator on the mucous membrane beneath the arch of the pubis is great, and unless care is exercised, injurious ulceration will be produced. The instrument also frequently interferes with walking and sitting.

The practical association of gradual dilatation with division of cicatricial tissue will now be more easily understood. As the expansion of the vagina goes on by the judicious and systematic use of larger and larger dilators, the natural anatomical relations of the parts become more clear and the lines of greatest resistance, that is, where the deposit of cicatricial material is the greatest, become prominent, in consequence of the more rapid expansion of the surrounding mucous membrane. When new bands are developed or those already visible are rendered sufficiently distinct, they should be successively divided. As in the primary operation, it is very important not to attempt to do too much at one time, but to make the division of cicatricial contractions subservient to continuous dilatation. The development of the bands by the latter process points out the tissues that should be cut and diminishes the danger of their section. In this way the healthy parts are spared and accidental wounding of neighboring organs avoided.

The instruments already described in connection with the primary operation for section of bands are also well suited for the division of cicatricial material at this stage of the treatment. But the apparatus for securing the patient in the knee-chest position is unnecessary, as the operation is not very painful, and may be done without an anæsthetic, or cocaine may be applied to the surface to be incised. For reasons already given, the supported knee-elbow position is preferable, and the most convenient mode of using it is shown in Fig. 22.

I find my dilating speculum* even more indispensable in this stage of treatment than in the primary operation for the section of bands. The necessity of complete symmetrical dilatation of the vagina is greater, and an instrument corresponding at all degrees of separation of the blades to the natural shape of the vagina, renders those parts of the organ which depart most widely from this form the most tense. In this way it furnishes, to a certain extent, a guide as to what should be divided. Its principal use, however, is to render the bands tense and prominent.

As the dilatation and division of cicatricial material proceeds, the exact nature of the perforating lesions present becomes more evident, and the form and relations of the fistula to the surrounding structures are more distinctly exposed to view. The cervix, which was, perhaps, altogether hidden, gradually becomes visible, and the anterior and posterior culs-de-sac are restored. The vaginal walls are relaxed and the uterus made movable. The vaginal mucous membrane loses its fiery-red hue, assumes a natural pink color, and all inflammatory thickening melts away beneath the pressure. The borders of the fistula lose their leather-like hardness, become smooth and soft, and may be more easily approximated. Time, patience and perseverance are all that are necessary, in most cases, to produce, by the careful and systematic employment of the method of gradual

* Three sizes are made; although the small size will do in most cases, when the dilatation is great the intermediate or largest size is preferable.

division and dilatation of cicatricial material, a distention of the vagina nearly equ that caused by the child's head at the time when the injury was done. The degre expansion necessary and the time required to produce it vary with the gravity of case, the amount of cicatricial contraction present, and the extent of the loss of ti at the fistulous opening to be supplied by the increased mobility of its borders. may be done in a few weeks or months, or, in severe cases, a whole year may be sumed. My experience has shown, however, that as long as the surgeon works per ently and intelligently toward a definite end, the patient does not become discoura However slow the advance, her faith remains strong, and she will aid all she can persist until the final triumph is achieved.

*Fixation of the Uterus.*—If the resources of treatment were now exhausted, a l class of fistulæ would still defy our efforts. When the greater part of the septu destroyed and the cervix forms a part of the upper border of the fistula, or only a s portion of the vaginal wall intervenes between it and the opening, while the ut

Fig. 22.

Supported knee-elbow position as I usually employ it in my private office. No special arrangement of the dress of the patient necessary.

remains fixed, even the most extreme vaginal distention, and relaxation will not fur sufficient tissue to fill the hiatus. The lower border of the fistula is fast fixed to pubic arch, the upper corresponds to the immovable cervix, and if the loss of subst is great the remnants of the septum can never be sufficiently stretched to bridge interval.

Jobert's solution of this problem is historical. He severed the connections of borders of the fistula from these fixed points above and below, and achieve mechanical success. Unfortunately the mortality following the operation was great; a large proportion of his cases died of peritonitis and pyæmia, due to extrav tion of urine. The operation was denounced by the profession and much of appreciation of the value of his previous labors was lost, in the opprobrium which attached to this operation, which was known as Jobert's cut. To Simon, the clo of the fistulous opening under these circumstances seemed impossible, and in his opi this condition constituted an indication for the performance of the operation of K

kleisis. The lesion was by this practice perpetuated, the genital functions destroyed, and a sac, which could never be completely emptied of urine, was formed. Inveterate cystitis and frequently the formation of renal and vesical calculi, pyelitis and the death of the patient were the results of the unnatural association of the urinary and genital organs.

But this grave difficulty which these great men sought in vain by different methods to overcome, can be surmounted by gradual and patient efforts, similar to those already described. The immovable uterus, by long continued and constantly increasing pressure, can be made movable, and in process of time be drawn down, without loss of function or great tension, to fill the opening.

Fixation of the uterus, when it complicates fistula, may result from injuries of the vagina, or may be due to a complicating cellulitis and peritonitis, or both of the causes may operate in the same case. The formation of cicatricial bands, obliteration of the culs-de-sac, rigidity of the vaginal walls and infiltration of the surrounding areolar tissue and reflections of the pelvic fascia, as has been seen, are consequences of injuries of the vagina occurring during labor, and tend to limit the mobility of the uterus. As the result of periuterine inflammation the broad and utero-sacral ligaments are thickened and shortened. The intestines and mesentery may become adherent to each other and to the uterus, and the planes of areolar tissue throughout the pelvis indurated and inelastic. In a word, a change takes place in the connective tissue and peritoneum surrounding the uterus, not very different from that we have already studied in connection with the injuries of the vagina. The plastic material exuded at the time of the inflammation having been only partially absorbed, is organized into new tissue, identical, in its minute anatomy and clinical characters, with cicatricial tissue. As the result of the rigidity and subsequent contraction of this new material, the uterus becomes fixed, and its position and form are frequently changed and distorted.

We have already considered the method by which the normal dimensions of the vagina and its obliterated culs-de-sac are restored, and the rigidity and thickening of its walls are overcome, and have seen that we possess the means of removing the causes of fixation in so far as they depend upon abnormal conditions of the vagina. It is, therefore, now only necessary to show the means by which immobility, due to the results of periuterine inflammation, is treated. The pathology of the two classes of causes of fixation are not very different, and the principle which underlies the treatment of both is the gradual distention of cicatricial tissue. The same vaginal dilators already described are useful in overcoming immobility of the uterus, because they exert pressure upon the cervix uteri as well as on the walls of the vagina. By gradual elevation the uterus is made movable. The lengthening of the ligaments and adhesions which permits ascent in the pelvis allows a corresponding descent.

The manner in which the upward pressure is exerted varies with the form of dilator employed. In vulvo-vaginal dilatation, the pressure of the T bandage is transmitted by the instrument to the uterus. The intra-vaginal dilators, resting on the perineum and posterior surface of the symphysis and arch of the pubes as fixed points, raise the organ to an extent varying with their size and length. As the dimensions of the instruments are gradually increased the uterus is more and more elevated and its rigid ligaments are stretched. Although something is accomplished by the use of the hard dilators, the intra-vaginal sponge instruments are peculiarly well adapted for this purpose. Being soft, they cause much less pain and do not excite pelvic inflammation, and being compressible, a much larger instrument can be introduced through the constricted orifice of the vagina. The elastic sponge adapts itself to the form of the cervix and the upper part of the vagina, and transmits the pressure more perfectly in the direction of the broad ligaments. The distensible force of the instrument is gradually increased after its introduction, by the imbibition of urine. These qualities make the

sponge dilators a most valuable means of increasing the mobility of the uterus, and without them progress is slow, painful, and even doubtful.

While the dilation of the vagina is advancing the effect of the upward pressure of the sponge instruments upon the uterus should be supplemented by downward traction with a hook. A double hook, like the one represented in Figure 23, is suitable for this purpose. The force employed should be small at first and never so great as to cause much pain. The organ should be daily drawn down several times in succession. These movements, although not nearly so forcible, are analogous to the passive motion employed by surgeons to overcome rigidity of joints.

Gradually, by the use of the means described, the cicatricial tissue is stretched, the uterine ligaments are elongated, and the organ becomes more and more movable. The borders of the fistula at last come in contact with very little tension, and the case, from being incurable, becomes simple.

The employment of this method is sufficient to demonstrate its utility, but in order to render the results obtained by its use clear to all, I made an experiment, in 1875, at the general hospital in Vienna. I measured the traction force necessary to approximate the borders of the fistula at different periods of the treatment. The case has been reported by Bandl,* and his account of the experiment is as follows :—

"The posterior border of the fistula was seized with a large double tenaculum, and

Fig. 23

Double Hook for exerting traction upon uterus—Spring Scale for measuring traction force.

although very considerable but cautious traction was exerted upon it, hardly any motion was elicited. . . . . .

"June 26. Bozeman divided a cicatricial band, corresponding in direction to the left lateral lumbo-sacral ligament, and introduced a medium size hard dilator, which was followed on the very next day by a larger one. On the fourth day afterward the effect of the treatment was evident. We measured the amount of traction force necessary to draw down the posterior border to the anterior one by hooking into it a large double tenaculum and connecting this to a spring scale (See Fig. 23). The necessary force required to draw the posterior border down to the anterior one was 2800 grammes. Further dilatation was obtained by always increasing the size of the dilators. The raw surfaces were frequently brushed over with a solution of nitrate of silver.

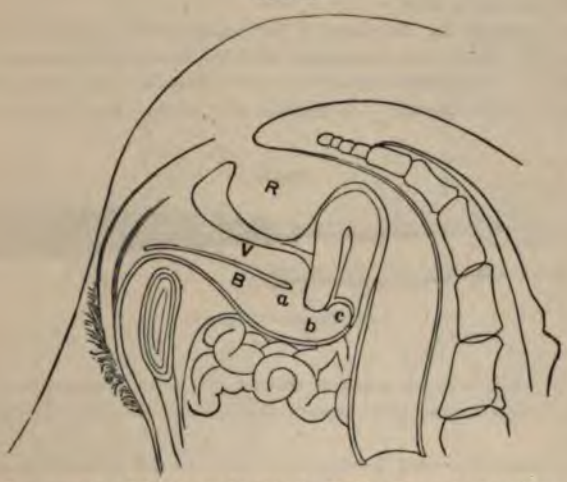
"July 13. Bozeman considered the patient ready for operation. Professors Billroth, G. Braun, Karl von Braun, Spaeth and many other surgeons were present. Just before the operation, by the use of the spring scale, it was demonstrated that it required a traction force of only 120 grammes to approximate the posterior border of the fistula to the anterior."

* Die Bozeman'sche Methode der Blasen-Scheidenfistel-Operation nebst vier von Bozeman an der Klinik des Prof. Karl v. Braun ausgeführten Operationen. Von Dr. Ludwig Bandl, Assistent an obiger Klinik und Privatdozent. *Wiener Medicinische Wochenschrift*, 1875, Nos. 49, 50 and 51.

*Incarceration of the Cervix Uteri in the Bladder.*—Incarceration of the cervix uteri in the bladder (Fig. 24) occurs as a complication of vesico-utero-vaginal fistulæ. The injury involves the anterior lip of the cervix which forms part of the upper boundary of the fistulous opening. The whole of the anterior lip, as far upward as the vaginal junction, may be destroyed,* or a portion may be left. In the latter case an adhesion is formed between the stump of the cervix and margin of the fistula. As a rule the loss of tissue in the vesico-vaginal septum is considerable. One or both of the ureters may be involved in the slough, and in consequence of subsequent contraction of the cicatricial borders of the fistulous opening their lower extremities may become distorted and their orifices drawn toward the cervix, as shown in Fig. 26.

The incarceration of the cervix uteri in the bladder results from retroversion or retroflexion of the uterus occurring after labor. In consequence of the displacement the posterior lip of the cervix is rotated forward, so that its extremity lies opposite to the lower border of the fistula or, in extreme cases, it is carried altogether within the

FIG. 24.




**Incarceration of the Cervix Uteri in the Bladder (Knee-chest position, Diagrammatic section, ¼ size).**
*a*, lower border of the fistula. *b*, posterior lip of the cervix uteri, the apparent upper border of the fistula. *c*, stump of the anterior lip of cervix, the real upper border of the fistula, turned into the bladder. *R*, rectum. *V*, vagina. *B*, bladder.

bladder. The gradual contraction of the cicatricial borders of the fistula tends to increase the deformity by drawing the anterior lip of the cervix upward, and no doubt the traction thus exerted is also a factor in the causation of the backward displacement of the fundus of the uterus. It is probable that this condition develops gradually. In a case which came under my care while in Edinburgh, the incarceration of the cervix was certainly produced slowly. Prof. Küller,† in his report of the case, and the operation, which I did on August 4th, 1858, states that the patient had been under his observation for three years, and that the condition was not developed until long after the fistulous opening was formed.

* See Case xv, with Fig. 7. *North American Medico-Chirurgical Review*, for July and November, 1857.

† *Edinburgh Medical Journal*, October, 1858.

When the incarceration is complete the upper part of the vagina is narrowed by the approximation of the posterior cervical reflexion of the vaginal wall with the lower border of the fistulous opening. The posterior lip of the cervix can be indistinctly seen through the fistulous opening; the os is hidden from view and the menstrual blood flows directly into the bladder.

The disengagement of the cervix from the bladder and the restoration of the uterus to its normal position is not easy, and so far as I am aware, had not been attempted previous to my first case successfully treated and reported in November, 1857. The operation which was then ordinarily done consisted in attaching the posterior lip of the cervix to the inferior border of the fistula. This is easily accomplished, and the incontinence of urine is relieved, but the patient is not cured. The incarceration of the cervix is perpetuated, the menstrual blood flows into the bladder and the uterine functions are interfered with. A pouch is necessarily formed in the vesical wall. Cystitis follows, and it in turn may induce pyelitis, or lead to the formation of vesical and renal calculi. Another objection to this operation is, that the distortion of the ureters, if present, is not relieved, and that their orifices are liable to be closed by being brought in contact with the cervix uteri.

In order to preserve the functions of the uterus, and to avoid the risk of these dangers, the cervix should be disengaged from the bladder, the uterus restored to its normal position, and the anterior lip of the cervix, instead of the posterior, attached to the lower border of the fistula. An account of a method by which this result was

Fig. 25.

Angular-bladed knives.

accomplished, together with an accurate description of the incarceration of the cervix, was published by me in the *New Orleans Medical and Surgical Journal*, May, 1860.* (Case xxxviii.)

The plan of treatment used in the case reported was successful, and I have continued to employ it until the present time. The method may be described as follows: An incision through the entire thickness of the septum, as shown in Fig. 26, is made with scissors or my angular-bladed knives (Fig. 25), in the lateral borders of the fistula. The fistulous opening is thus increased in size and the cervix is liberated. The mobility of the uterus is afterward gradually increased by the pressure of sponge dilators, until the fundus can be raised and the cervix drawn into the vagina without difficulty. When this has been accomplished, the fistulous opening assumes the form shown in Fig. 27. The diagram is also intended to explain the effect of the treatment upon the distortion of the lower extremities of the ureters when it exists, and shows that their orifices are drawn away from the cervix uteri and returned to their normal positions.

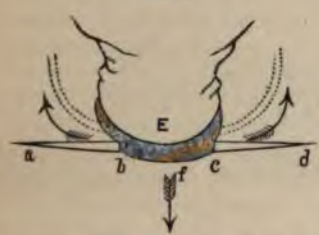
* In speaking of the treatment of the case, I said: "The preparatory treatment in the case consisted in cutting the constricted portion of the vagina, and then enlarging the fistula laterally, so as to admit of a disengagement of the neck of the uterus from its confined situation. This being done, a sponge tent large enough to fill the vagina was introduced. Twice a day this tent was removed and injections of cold water used. By this course the canal was kept dilated and the uterus thereby prevented from returning to the malposition in which it was found."

The complication having been overcome by this preparatory treatment, the subsequent operation for the closure of the fistula is comparatively easy.*

*Incarceration of the cervix in the rectum* is a complication of extreme rarity. I have seen only the case which I published in the *Trans. Am. Gynæcological Society, 1879*, page 373. In this instance the cervix was destroyed above the vaginal junction, and the stump formed a part of the upper border of the fistulous opening. The fistula extended through the posterior cul-de-sac of the vagina into the rectum. From its relation to these parts, the peritoneum must necessarily have been implicated, but a fatal peritonitis was no doubt prevented by the agglutination of two layers of the peritoneum forming Douglas's pouch, previous to the separation of the slough. The opening, if (as should always be done) all the important structures involved are designated, was a *recto-peritoneo-utero-vaginal fistula*. The uterus was anteflexed and the os turned into the rectum. The lower border of the fistula was drawn forward by a cicatricial band, and lay in close proximity with the anterior lip of the cervix. (Fig. 28.)

The treatment of this case consisted in the section of the cicatricial bands, and the dilatation of the vagina with sponge dilators to the greatest possible extent. Fig. 29.

FIG. 26.




Operation for disengaging the cervix uteri from the bladder.
*a b, c d*, lateral incisions extending through vesico-vaginal septum. E, posterior lip of cervix uteri; *f*, lower border of the fistula. The dotted lines indicate the situations of the ureters, and the arrows the directions in which pressure will be exerted by the subsequent use of vaginal dilators.

FIG. 27.

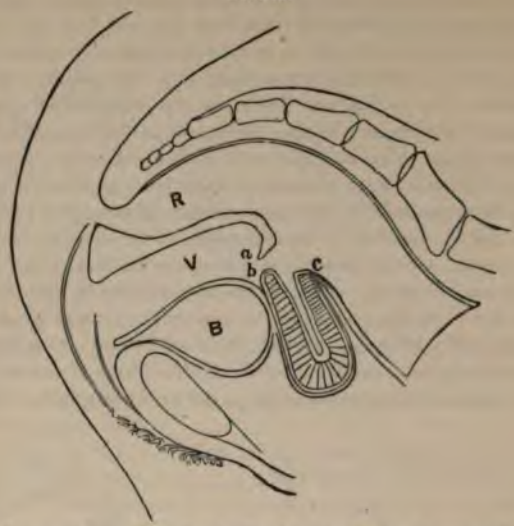
Result of Treatment.
*a d*, orifices of the ureters restored to their normal positions. E, posterior lip of the cervix. The os uteri and anterior lip of the cervix have been brought into view.

By these means the displacement of the uterus was corrected, the cervix restored to the vagina, and the inferior border of the fistula was passed backward, so as to be opposite to the posterior instead of the anterior lip of the cervix. The case having been thus made comparatively simple, the fistula was closed at a single operation with my button suture.

*Cystitis.*—Cystitis is a frequent and important complication. When it occurs in connection with urinary fistula, it is almost uniformly due to the retention of urine in the bladder. Small quantities of urine remain in the bladder when the situation of the fistulous opening is unfavorable for perfect drainage, or in consequence of sacculation of its

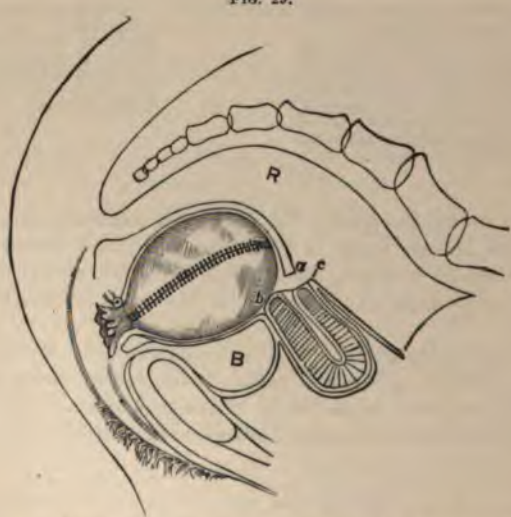
* My button suture, while possessing many other advantages, is particularly useful in this class of cases. When the opening has been closed by the sutures, the posterior lip of the cervix rests against and is supported by the upper border and convex surface of the leaden button, and the tendency to the reproduction of the incarceration, before union of the borders of the fistula has occurred, is by this means prevented. The tension which would otherwise be sustained by the central sutures alone is thus distributed, by the plate, upon all.

FIG. 28.




Incarceration of the Cervix Uteri in the Rectum (supported knee-elbow position, diagrammatic section, ¼ size).
*a*, lower border of the fistulous opening drawn forward by the contraction of a cicatricial band. *b*, anterior lip of the cervix, the apparent upper border. *c*, stump of the posterior lip of the cervix, obliterated recto-vaginal fold of the peritoneum, and the rectal wall, which structures form the real upper border of the fistula. V, vagina. R, rectum. B, bladder.

FIG. 29.




Dilatation of the Vagina after the division of the cicatricial bands. Intra-vaginal sponge dilator in place. (Diagrammatic section, supported knee-chest position, ¼ size.)
*a*, lower border of the fistula, now almost opposite *c*, the upper border. *b*, anterior lip of the restored cervix uteri. R, rectum. V, vagina. B, bladder.

walls. The latter condition may be associated with displacements of the uterus or pelvic inflammations, but is most frequently due to cicatricial contraction of the vagina, which, producing distortion of the septum, throws the base of the bladder into folds and pouches. Stagnant pools of urine are retained in the bladder in contact with the atmosphere. Fermentation ensues, the urine becomes ammoniacal and putrescent, and being thus rendered intensely irritant, its contact with the vesical mucous membrane engenders cystitis.

If the inflammation of the bladder is left without treatment, the deleterious effects of the contact of ammoniacal urine with the wound, during and after operation, are obvious. If, notwithstanding this difficulty, the fistula is closed, the sacculation of the bladder makes the cystitis permanent, and the patient is exposed to the danger of the occurrence of pyelitis, or her sufferings may become sufficiently great to justify the reproduction of the incontinence by the formation of an artificial fistula. The distorted vagina should, therefore, be dilated by the method which I have already described. The folds and pouches of the mucous membrane of the bladder are in this way smoothed out, and the septum restored to its natural form. The bladder must also be frequently irrigated. The pus and bacteria are thus removed, and the injurious action of the ammoniacal urine upon the vesical mucous membrane, to a great extent, prevented. When the opening into the bladder is very large, the vaginal douches will be sufficient for this purpose, but when the fistula is small, the bladder must be washed out by means of a soft catheter

*Prolapse of the Bladder.*—There is frequently a tendency of the fundus of the bladder to protrude through the fistulous opening. The disposition to prolapsus is greatest when the fistula is large and involves the urethral portion of the septum, but that the complication does not depend entirely upon the size of the opening is evident, because frequently it does not occur when the fistula is large, and may be present to an extreme degree when the opening in the septum is of a comparatively small size. This fact and observation of cases have led me to attribute the prolapsus to dilatation and atony of the walls of the bladder, due to long-continued distention of the organ by retention of urine during the protracted labor or during the time which elapsed before the slough separates and the perforation takes place. The fundus of the bladder being thus enlarged and flaccid, lies upon the vesico-vaginal septum. When there is no fistulous opening its weight tends to produce cystocele and procidentia uteri. If a fistula is present a gradual protrusion takes place, and nearly the whole of the interior of the bladder may be inverted into the vagina. When the uterus is movable the traction of the bladder, which is constantly increasing in weight by relaxation of the mucous membranes and congestion of its vessels, draws the uterus downward. As the organ sinks in the pelvis the protrusion and inversion of the bladder become more and more complete, until, finally, in the worst cases the bladder may escape from the vulva, presenting an appearance similar to an extroverted bladder due to congenital defect in the pubic arch. In these distressing cases the orifices of the ureters are visible, and nearly the whole of the vesical mucous membrane is exposed to view. The congestion of the vessels, attrition of the linen and desiccating action of the atmosphere soon induce inflammation of the mucous membrane. The mouths of the ureters become everted, œdematous, and frequently surrounded by large, exuberant granulations, and the whole mucous membrane acquires a dark bluish-red appearance. Large numbers of granular points and fungosities, due to unhealthy granulations of numerous abrasions and small areas of ulceration are formed on the exposed surface. Such an extreme degree of prolapse rarely occurs unless the uterus is movable. When that organ is fixed the utero-vesical ligaments and the attachment of the upper part of the vesico-vaginal septum to the cervix prevent great mobility of the bladder.

The treatment of the grave cases of prolapse of the bladder is important and some-

times difficult. The granulations should be brushed with a solution of nitrate of silver (twelve per cent.) every day. The patient should be placed in the supported knee-elbow position, and the protrusion of the bladder reduced. To prevent recurrence of the prolapse is difficult, but this can usually be done by means of a sponge dilator introduced into the vagina, and kept in place, if necessary, by a T bandage. The instrument should be removed once or twice a day, to allow the use of douches. The sponge dilator supports the bladder by sustaining the uterus, and by occupying and distending the vagina it prevents the recurrence of the prolapse. By obturating the fistulous opening it leads to the collection of urine in the bladder, which distends its cavity and lifts up the fundus. The congestion is thus relieved, and the unhealthy condition of mucous membrane so far disappears as to justify the closure of the fistulous opening.*

*Injuries of the Ureters.*—In the study of the injuries of the ureters, it is important to remember the anatomical fact that they enter the vesico-vaginal septum at a point on each side of and about three-quarters of an inch distant from the cervix uteri, and traverse its substance to the extent of about one and a half inches before opening into the bladder. One of the ureters may therefore be laid open, constituting a uretero-vaginal fistula (Fig. 32), without perforation of the bladder, but more frequently the slough extends through the entire thickness of the septum, and a vesico-uretero-vaginal fistula (Fig. 30), involving one or both ureters, is produced.

In either of these forms of fistula the broken end or new orifice of the ureter may be everted or stenosed. The lower extremity of one or both of the ureters is everted when the free border of the fistulous opening in which it lies is turned into the vagina. This distortion of the margin of the fistula is frequently the result of the traction of cicatricial bands in the vagina, or it may be associated with prolapse of the bladder. Obstruction or stenosis is commonly due to the implication of the orifice of the ureter in the cicatricial tissue which forms the border of the fistula.

In the performance of the operation for the closure of a fistula involving the ureters, obstruction of the orifice of one or both is liable to be occasioned by the approximation of the borders of the fistulous opening, or a suture may pierce and partially or entirely occlude its lumen. Something must therefore be done to prevent the occurrence of these accidents.

As my claim of priority in the recognition of these dangers and the employment of a successful method of avoiding them has been questioned, I will refer to my first description of the lesion and the treatment of uretero-vesico-vaginal fistula. I encountered the case in June 1856.† Fig. 30, which is copied from the original drawing, shows the positions of the orifices of the ureters. In the description of the operation for closure of the fistula I said: "In addition, I may state, however, that in the paring process, the end of each ureter was cut off and slit on the vesical side of the septum to the extent of a quarter of an inch, the object of this being to throw the entrance of the urine into the bladder away from the approximated edges of the fistula." The knife which I used to incise the ureters is shown in Fig. 31. I also appreciated the importance of "straddling" the ureters and urethra; that is, I introduced the sutures in such a manner as to avoid including these structures.

Subsequent experience has convinced me that it is better to slit the ureter and to allow the healing of the incision to take place some time previous to the performance of the operation for closure of the fistula. Two advantages are gained by this modi-

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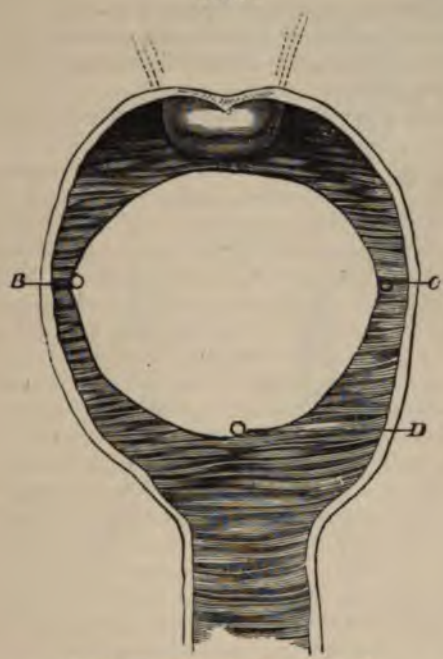
* In the performance of the operation an advantage of the knee-chest position is well seen. The force of gravitation generally causes the fundus of the bladder to fall forward, and it is rarely necessary to resort to such expedients as filling the bladder with sponges to prevent prolapsus.

† Case VIII. *North American Medico-Chirurgical Review* for July and November, 1857.

fication. If hemorrhage from the ureter follows the incision, the bleeding point is not shut up in the bladder, and if after healing has occurred, the orifice of the ureter is not sufficiently turned into the bladder, it may be incised a second time.

Stenosis of the ureters may also be treated by incision or excision. Care must be

FIG. 30.




Urethro-uretero-vesico-vaginal fistula.
B, C, orifices of the ureters. D, vesical extremity of the urethra.

taken to lay open the whole length of the constricted portion. The orifices of the ureters may also be dilated with sounds.

Uretero-vaginal fistula is extremely rare. In 1870 I encountered a case (the only one I had then ever seen) complicated with cicatricial contraction of the vagina (Fig. 32). I first divided the cicatricial band and dilated the vagina. In order to reëstablish the

FIG. 31.

Knife for slitting lower extremity of ureter.

communication with the bladder, I removed a small circular piece of the septum, including the extremity of the injured ureter.* In other words, I converted the uretero-

* When this operation is done in order to expose the orifice of the ureter when no fistula is present, I have given it the name of *kolpo-uretero-cystotomy*.

vaginal into a uretero-vesico-vaginal fistula (Fig. 33). The lower extremity of the tube was then slit on its vesical side and in closing the opening in the bladder with my button suture, which was done at a single operation, the sutures were made to straddle the ureter.

*Pyelitis.*—The principal causes which lead to the development of pyelitis as a complication of fistula are obstruction of the ureters and cystitis. We have already studied stenosis of the ureter in that portion of its length which is contained in the vesico-vaginal septum, but the calibre of the duct may also be obstructed or contracted by the impaction of a calculus or the pressure of a peritoneal cicatrix at any point between this part and the pelvis of the kidney.

The symptoms which I have observed to be present in this disease are: more or less

FIG. 32.

Uretero-vaginal Fistula complicated by cicatricial contractions of the vagina. (Horizontal diagrammatic section, knee-chest position).
*a.* Cicatricial band. The distorted lower extremity of the ureter indicated by dotted lines.
*c* is placed a little external to the fistula, which is hidden from view by the cicatricial band. The blades of my dilating speculum are shown in position, and between them, in dotted lines, is seen the trigone of the bladder and its relations to the ureters.

FIG. 33.

Result of treatment. Cicatricial contraction of the vagina expanded by dilatation and incisions. *c.* Orifice of ureter restored to the bladder.
*a.* Uretero-vesico-vaginal fistula, made by removing a circular piece of the septum, in order to turn the ureter into the bladder. Ureter obliterated between opening and corresponding angle of trigone.

constant pain in the lumbar region, attacks of renal colic, nausea and vomiting, anæmia, emaciation and the cachexia of chronic suppuration. At times the course of the disease is varied by the occurrence of severe rigors, accompanied and followed by fever. Pus and blood may be seen to exude from the orifice of the ureter, which is exposed to view by the fistulous opening.

I have recently devised a new method of treatment for this disease, and have used it in two cases, both of which are now cured. In my first case, the pyelitis occurred as a complication of a fistulous opening in the bladder. As, in addition to its interest in this connection, it illustrates many of the complications of urinary fistula which we have studied, I will report the case at length.

The patient was sent to me by Dr. Sands, of Port Chester, N. Y., and was admitted into my service in the Woman's Hospital. The following record of the case was kept by Dr. William Gilmer, and the accompanying drawings were made during the course of the treatment by Dr. John Aspell,* both members of the House Staff. The details of the treatment of the case were carried out by the House Surgeon, my son, Dr. Nathan G. Bozeman. The urine was examined by Dr. H. C. Coe, Pathologist of the Hospital.

Mrs. S. L.; aged 34; was admitted September 20th, 1886. The patient has borne four children at full term, and had one miscarriage. During the two months preceding delivery in her last three pregnancies, which were normal in other respects, she complained of pain in the left lumbar region. In her last pregnancy this was more severe than before, and was increased by sudden jars of the body or by moving about. She also then noticed, for the first time, the occurrence of an abundant red sediment and a deposit of thick, ropy mucus in her urine. She was delivered of a dead child April 25th, 1886, about five months previous to admission into the hospital, after a protracted labor of fifty-five hours. The presentation is believed by the patient to have been a foot, and the delivery effected by traction, without mutilation of the child, but being under the influence of chloroform at the time, she is ignorant of exactly what was done. The urine began to flow through the vagina almost immediately after the child was born, and the labor was followed by a serious illness. The symptoms present were high fever, rapid pulse (130 for several weeks, as she was afterward informed by her physician), and abdominal pain and tenderness. A slough was removed from the vagina, with scissors, three weeks after delivery. Although the violence of the constitutional symptoms abated somewhat about this time, the lumbar pain, from which she had suffered during pregnancy, continued, and grew worse, and began to assume, at times, a paroxysmal character, and to radiate downward toward the bladder. Her sufferings were increased, at times, by the occurrence of severe rigors, sometimes daily and sometimes twice a day. The chills and paroxysm of pain frequently occurred at the same time.

During the last two months she has gained slowly in strength, and was able to walk a little, for the first time, three weeks previous to admission into the hospital. But the lumbar pain has continued, and has been gradually growing worse, and the chills and acute paroxysms of pain still occur at frequent intervals. She also suffers from anorexia, nausea, occasional vomiting, night sweats, cold hands and feet, and she has noticed that her complexion has become pale and sallow. The incontinence of urine has continued. At times large pieces of mortar-like substance have come away from the vagina. The contact of the urine has caused burning pain, itching and excoriation of the labia and buttocks.

The patient is now somewhat emaciated, pale and cachectic-looking. Her temperature and pulse are normal. Her urine contains a trace of albumen, and deposits an abundant sediment consisting of pus, triple phosphates, bacteria, epithelium and a few blood corpuscles.

Sept. 21st. The patient was placed in the supported knee-elbow position, and an examination made. The external genitals and buttocks presented the ordinary appearances of inflammation due to the action of alkaline urine. The perineum was torn, the laceration extending down nearly to the sphincter ani. The finger passed readily into the vagina, and disclosed the presence of a large opening into the bladder, but the cervix uteri could not be made out. Bozeman's dilating speculum and perineal

* All the other drawings in the paper, except those representing instruments, were also made by my friend, Dr. Aspell. I am greatly indebted to him for the care and skill with which he embodied my ideas in regard to the normal and pathological relations of the organs represented, and with which he pictured the lesions and results of treatment described in the text.

elevator were then introduced, and the lower part of the vagina and the fistulous opening were easily exposed to view. The vaginal mucous membrane was tender to the touch and of a bright-red color.

The fistulous opening was seen to involve the greater part of the vesico-vaginal septum, and its form to be heart-shaped, the apex corresponding to the symphysis pubis. A sound was passed into the remnant of the urethra, and it was found that its root formed a part of the border of the fistula, and that obliteration of its vesical extremity had occurred. The left border of the fistula was fixed, inverted and distorted by cicatricial thickening, which extended partly around the vagina and contracted its calibre at this part. The upper border of the fistula was immovable. Beyond this point the vagina was obliterated, and the cervix uteri invisible.

The narrowing, at the expense of its posterior wall, of the upper part of the vagina gives the interior of the organ a conical shape, its apex corresponding with the upper border of the fistula, and the base with the vaginal orifice. When the vagina is dilated by the speculum, it is easy to look through the large fistulous opening into the bladder, and to see its swollen, red and inflamed walls, and the urine occupying its lowest part. The cavity of the bladder is very much contracted, and its mucous membrane thickened and thrown into folds and pouches. There is no tendency to prolapse, except along the upper border of the fistula, where an œdematous fold of mucous membrane appears at the margin of the opening.

From the extent and situation of the fistula, it is almost certain that one or both ureters are involved in the injury, and that the slough extends through the septum up to the cervical junction. The anterior lip of the cervix is probably destroyed. The posterior lip is hidden from view by obliteration of the posterior cul-de-sac and cicatricial narrowing of the vagina. The fistula, in order to designate the implicated structures, should be called an urethro-utero-uretero-vesico-vaginal fistula. See Fig. 34.

Sept. 24th. The patient was secured in the knee-chest position, by means of Bozeman's apparatus (Fig. 9, page 524), and etherized. A number of transverse bands, constricting the vagina, having been stretched and rendered prominent by Bozeman's dilating speculum, were divided. A few superficial incisions were also made in the adhesion already described as obliterating the upper part of the vagina. A vulvo-vaginal dilator, forty-five millimetres in diameter, was then introduced into the vagina and secured in place by a T bandage.

Sept. 30th. The size of the dilator has been increased to fifty millimetres. Nitrate of silver (12 % solution) has been applied daily to the raw surfaces, which are now granulating in a healthy manner. The vagina is still sensitive, and the introduction of the instrument causes a good deal of pain, and its pressure beneath the pubes has caused inflammation and a superficial slough of the mucous membrane. Considerable space has been gained. Traction was made to-day upon the upper border of the fistula, and it was found to be immovable.

Oct. 3d. The instrument no longer causes pain, and the patient is more comfortable.

On Oct. 4th the patient had a severe chill, followed by a temperature of 104.8°, headache, nausea and vomiting. The temperature soon returned to normal, and she was better until the 6th, when the chill was repeated. Since the latter date there has been no return of the fever. The dilatation has been continued without interruption since the operation, and the cut surfaces have healed. The relation of the parts can now be more exactly made out; the remnant of the anterior lip of the cervix is now recognized as forming a part of the upper border of the fistulous opening, but the posterior lip is still hidden from view by the contraction of this part of the vagina and the obliteration of the posterior cul-de-sac. To-day, in order to facilitate the expansion

of this part, several bands, which had gradually become prominent, were put on the stretch and divided.

Oct. 20th. The dilatation has been continued, and the bands divided from time to time when they became prominent. Progress is gradually being made. The extremity of the posterior lip of the cervix is now visible, and superficial incisions are being made along its surface, with the object of gradually severing the adhesion between it and the vaginal wall. The os uteri is pervious, and a probe passes into the uterus about one inch. The borders of the fistula are somewhat more movable, but cannot be brought in apposition by even an extreme degree of traction, with a hook fastened in the cervix.

Oct. 27th. Having reached the highest degree of dilatation attainable by the use of

Lesions present at the time when treatment was begun. (Diagrammatic section, knee-chest position, ¼ size.)

*a*, Lower border of the fistula and obliterated vesical extremity of the urethra. *c*, upper border, formed by the stump of the anterior lip of the cervix and wall of the bladder. Above *c* is shown the cicatricial narrowing of the vagina, the adhesion between vagina and the cervix uteri, and the obliteration of the posterior cul-de-sac. *e*, Perineum lacerated down to the sphincter ani. Uterus cut obliquely, in consequence of the lateral displacement of the organ. Arrows show direction of dilating force and movements of structures. V, vagina. R, rectum. B, bladder.

a hard vulvo-vaginal instrument, an intra-vaginal sponge dilator, about fifty-five millimetres in diameter, was introduced.

Nov. 20th. The patient has worn the soft instrument without discomfort, and has been able to walk about with it in place. Incisions have been made at intervals, whenever a band became prominent. Passive motion of the uterus has been employed to increase its mobility. The advance in expanding the upper part of the vagina has been more rapid since the use of the sponge dilator was begun. The posterior lip is now fully exposed to view, and it is evident that it, like the anterior, was in great part destroyed by the slough, the os uteri lying almost on a level with the attachment of the vagina; the uterus is movable, and allows the borders of the fistula

to come together partially on the right side, but not without great tension. The fundus is drawn to the right and the cervix to the left. No difficulty has been experienced in keeping the vagina free from urinary deposits, although the urine has been constantly alkaline and contained pus. The size of the sponge dilator has been increased to sixty-five millimetres (Fig. 35).

Nov. 30th. The borders of the fistula can now be imperfectly approximated with much less tension, and the vagina is much distended at its upper as well as its lower part. The general health of the patient has improved, but she is still anæmic and weak, and her skin retains its sallow, unhealthy appearance. She menstruated since the last note, for the first time after her confinement.

Dec. 3d. To-day, by the use of the *linen test*, the orifice of the right ureter was found lying in the bladder, just beyond the edge of the free border of the fistulous opening, and about three-quarters of an inch from the cervix, and was displayed by turning it out with a tenaculum; the left was not discovered.

Dec. 12th. The patient has had, during the past week, a number of paroxysms of

FIG. 35.

Progress made in the treatment. Intra-vaginal sponge dilator in place. (Diagrammatic section in supported knee-elbow position.)

severe pain, lasting several hours, accompanied by vomiting, great prostration and weak pulse. The pain was felt in the left lumbar region, and radiated along the course of the ureter.

Dec. 15th. The patient had a chill yesterday, accompanied by the pain in the left lumbar region and a temperature of 105°, which to-day has fallen to 101°.

Dec. 17th. A second search was made for the left ureter, and it was discovered. Pus was seen to exude, drop by drop, from a small point on the everted border of the fistula almost in immediate contact with the mutilated anterior lip of the cervix. Upon closer inspection, the orifice of the left ureter was found at this point. A delicate probe was then passed into the ureter for two inches, when it met an obstruction. The orifice of the ureter was found to be very much contracted. It lay imbedded in a mass of cicatricial tissue, and was bent at its lower part by being drawn toward the cervix. The use of vaginal dilatation was ordered to be discontinued.

Dec. 22d. The alarming symptoms continue, and the patient's strength is rapidly

becoming exhausted by the temperature and the pain. The discharge from the left ureter is profuse. It consists of urine, containing a large proportion of pus, and has a very offensive odor.

Dec. 24th. Dr. Bozeman passed a filiform bougie into the left ureter for seven inches, when it met an obstruction.

Dec. 25th. A French, No. 7, olive-tipped catheter was introduced into the ureter this morning, without difficulty, for six and a half inches, when it met an obstruction. A warm solution of carbolic acid (1–80) was repeatedly injected through the catheter with a small piston-syringe and allowed to escape. The injection of a larger quantity than half a drachm at one time caused pain in the lumbar region. About one drachm of putrid pus was washed out in this way. Immediately after the irrigation of the ureter the patient's temperature was 101°, pulse 104, and she has since been more comfortable. At 4.30 P. M., the ureter was again washed out by means of the catheter, which had been left in place. Much less pus was removed than in the morning.

Dec. 26th. The douching of the ureter has been repeated at intervals of four hours since yesterday. The secretion of the left kidney which flowed from the catheter was collected for two hours. It amounted to about half an ounce. The sediment which formed at the bottom of the vessel, constituting about one-third of the whole volume, consisted principally of pus. A few red blood corpuscles could also be seen under the microscope, but there were scarcely any epithelial cells. The catheter, after having remained in place for twenty-four hours, was removed this morning. No pain or other symptom referable to its presence has occurred. On the contrary, the patient's condition has improved. Her temperature is now normal for the first time since the 12th, and she is suffering no pain. The catheter had become roughened by the deposit of small particles of phosphate of lime on its surface. Although the ureter seemed very tolerant of its continued presence, it was thought better to remove it after each irrigation in future, as very little difficulty was experienced in introducing it by means of Bozeman's uterine forceps. (Fig. 36.) When a new catheter was introduced to-day, it met no obstruction until it passed into the ureter a distance of eleven inches. It is believed that its extremity reached the pelvis of the kidney, because now two or three drachms of fluid can be injected without causing the peculiar pain already described, and a larger quantity of pus than ever was removed.* From the sensation imparted to the hand by the catheter, and from the fact that at each examination an obstruction of the ureter has hitherto been found at a different point along its course, together with the symptoms, it seems probable that calculi have been passing through the ureter. None have been found in the urine, but this is not important, because they would almost necessarily have been washed away by the vaginal douches, and lost. It is also highly probable that dilatation of the ureter resulting from the continued presence of the catheter, and afterward from its frequent introduction, favored the passage of the concretions.

Jan. 5th. The washing out of the pelvis of the kidney has been continued daily since the last note, and a solution of bichloride of mercury (1–20,000) has been substituted for the carbolic acid.

Jan. 22d. A remarkable change has taken place in the patient's condition. Her temperature has remained normal since the 26th of December. She has gained flesh and strength and has had no pain. The discharge from the left ureter has gradually become so slight that the pelvis of the kidney is now washed out only every second day.

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* My observations have led me to determine the average length of the ureter to be twelve inches. About one inch of the lower end of the ureter had been destroyed. The catheter, therefore, had reached the pelvis of the kidney.

Feb. 2d. The urine now contains only a trace of pus. The irrigation is still kept up, but only at intervals of three or four days. The constricted orifice of the left ureter has been slit up with an angular knife for about a quarter of an inch on its vesical

FIG. 36.

Catheterization of the ureter preparatory to irrigation of the pelvis of the kidney. (Drawn from nature.) (Supported knee-elbow position and my dilating speculum, with perineal elevator, in use. ¼ size.)
*a*, fistula; *b*, connected by a dotted line with the orifice of the left ureter; *d*, catheter; *e*, uterine forceps; *c*, mutilated cervix uteri.

FIG. 37.

Catheter, showing spiral or corkscrew course of the ureter.
When introduced, the instrument was straight. When removed, it retained the form given to it by the ureter. A stilet was afterward shaped, as shown in the figure, in order to preserve the peculiar curvature of the catheter.

surface, in order to turn its orifice into the bladder. The use of the sponge dilator is to be renewed, the instrument to be worn for a few hours only every day.

Feb. 20th. Bands have been cut at intervals since the last note, and the dilatation

has been continued. The uterus is returning to its normal position and is more movable The orifice of the ureter has been dilated with steel sounds every second day; it now admits a No. 20 of the French scale. There is no longer any pus in the urine, the renal symptoms having subsided; the irrigation of the ureter and the pelvis of the kidney has been discontinued.

March 2d. The patient was allowed to go home. She was directed to wear a hard vulvo-vaginal dilator, it being the most convenient and manageable in her hands.

April 1st. The patient has returned, after an absence of about three weeks. She has gained twelve pounds in weight and is looking well.

April 27th. On April 8th an attempt was made to combine drainage with sponge

FIG. 38.

Approximation of the borders of the fistula by drawing down the cervix. Drawn from nature. (Supported knee-elbow position, ¼ size.)
*a* double hook. *c*, mutilated cervix uteri. *b b*, borders of the fistula brought together. The letters are placed opposite to the orifices of the ureters.

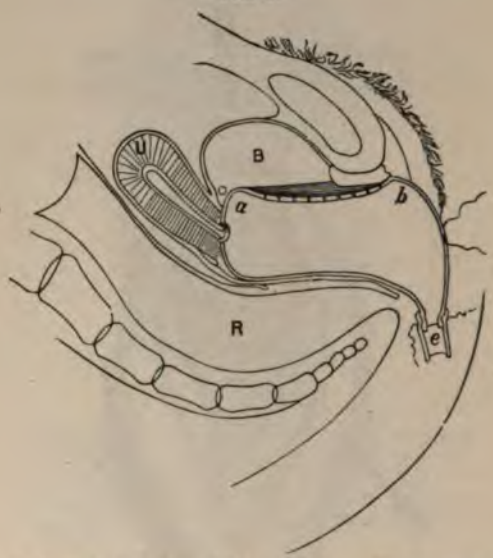
dilatation. An oil-silk-covered sponge dilator, with a hard drainage tube occupying its central part and extending out from its lower extremity, was made and introduced. Unfortunately, it was found that the urine could not be made to flow out through the tube; but although the drainage was a failure, the presence of the tube not only did not interfere with dilatation, but was useful in giving firmness to the bag, making it easier of introduction and increasing its upward pressure. Since the above date the dilatation has been energetically carried on ; the sponge instrument now used measures seventy millimetres in diameter. Bands have also been divided at frequent intervals. The vagina is now greatly distended and the uterus has become sufficiently movable to allow complete approximation of the borders of the fistula (Fig. 38). Still, the traction

necessary to do this, being about six pounds, is great enough to endanger the success of the operation for closing the opening.

April 28th. During the past week the patient has had some pain along the course of the left ureter and last night a slight elevation of temperature. Dr. Bozeman believes that the sponge dilator is pressing on the orifice of the ureter (the first time in his experience) and is causing obstruction to the flow of urine. Dilatation with the large sponge instrument is ordered to be discontinued, and the No. 50 hard vulvo-vaginal drainage dilator used instead.

May 11th. A vulvo-vaginal drainage dilator (Figs. 39 and 40), which Dr. Bozeman has devised since the last note, was introduced to-day for the first time.

FIG. 39.




Vulvo-vaginal drainage dilator in place. (Diagrammatic section in the dorsal position.)
*a* is placed at one extremity of the groove on the upper surface of the instrument, *b* at the other. The perforations at the bottom of the groove are seen in section. A little behind *a* is seen, in the background, the orifice of the left ureter. *e*, tube connecting with urinal. U, uterus; the os uteri is shown in apposition with the opening in the extremity of the dilator, through which drains urine from left ureter also. R, rectum. B, bladder.

May 20th. The drainage is almost perfect; the patient is able to keep dry, and is more comfortable than she has been since the fistulous opening was formed.

The redness and inflammation about the vulva and vagina, which could not be entirely removed by douches and cleanliness, are rapidly disappearing.

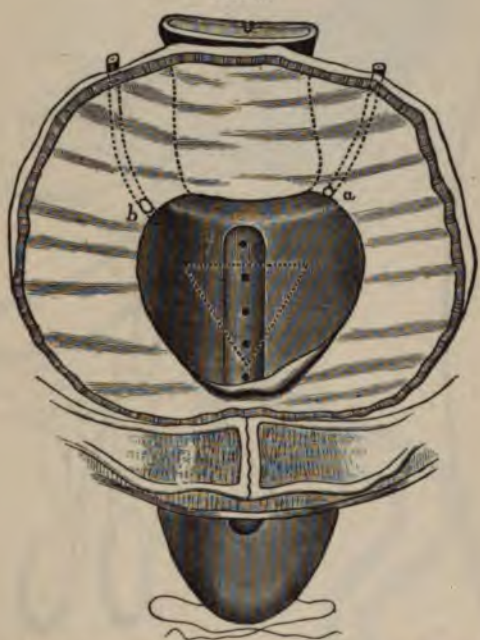
June 15th. A comparison was made between the relative secreting capacities of the two kidneys; a No. 8 French catheter was passed into the pelvis of the left kidney and a No. 10 into the right, and the urine collected separately from each. It was found that in fifteen minutes the left kidney secreted 5 ccm., and the right 15 ccm. The urine from the right kidney was normal, that from the left contained a trace of albumen, and the percentage of urea was small. The capacity of the pelvis of the left kidney when distended was also measured, and found to be 2½ drachms.

June 16th. A flexible steel renal sound (Fig. 41) (which Dr. Bozeman has had constructed for the purpose) was introduced into the pelvis of the kidney to-day without difficulty (Fig. 42). After the use of the sound, the pelvis of the kidney was irrigated, and irregular flakes and masses of muco-pus were removed. Previous to the introduction of the sound no detritus had come away for a long time.

June 22d. There is no longer any discharge from the kidney, and the drainage dilator is working satisfactorily.

July 1st. The patient was discharged to day, because the hospital is to be closed for the summer months. (The record of the case ends here.)

FIG. 40.




View from above, of the interior of the bladder, fistulous opening and drainage dilator. (Diagrammatic.)
*b*, orifice of right, and *a*, of left ureter. The normal position of the trigone is indicated by the dotted lines and the distance between *a* and *b* and the posterior angles of the triangle show how much of the lower extremities of the ureters was destroyed. The diagram illustrates the principle of drainage. The dilator obturates the fistulous opening. Its upper surface takes the place of the loss of tissue at the base of the bladder, and the margins of the fistula are closely applied to the instrument. *a* also shows the abnormal relation of left ureter to cervix uteri and its restored position in this cavity of the bladder from the vagina.

Aug. 23d. The patient has been under the care of my son since she left the hospital. The dilatation has been continued. The traction force necessary to secure complete coaptation of the borders of the fistula is now 2½ pounds.

The operation for the closure of the fistula will be done as soon as the hospital reopens. This delay is to be the less regretted because it is desirable to be certain that there will be no return of the inflammation of the pelvis of the kidney.

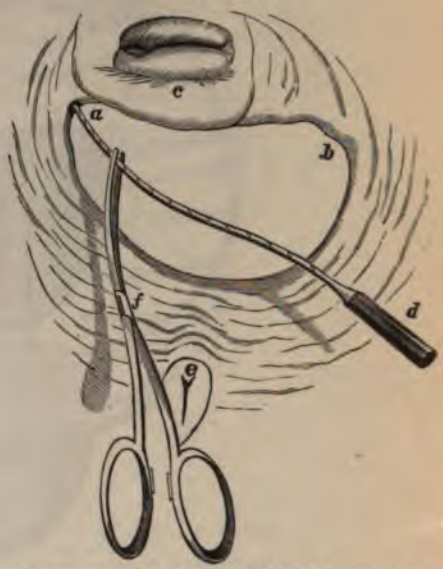
[NOTE, Dec. 13th.—Since the above history went into the hands of the printer, the resistance to the coaptation of the borders of the fistula having been reduced to one and a half pounds; the operation for the closure of the opening was performed on November 13th. It was done in the knee-chest position.

The patient was secured during the administration of ether, and the parts exposed

FIG. 41.

Flexible steel renal Sound.

FIG. 42.

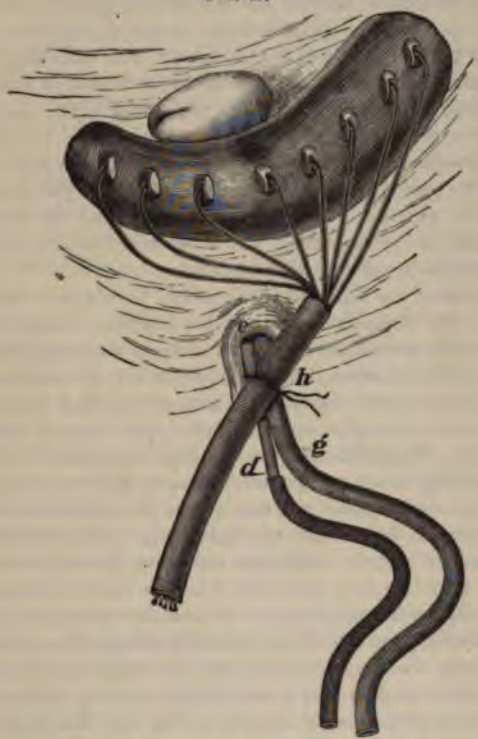



Introduction of renal sound. *a*, orifice of left ureter. *d*, renal sound. *b*, is placed opposite the orifice of right ureter, which is turned into the bladder. *f*, uterine forceps. *c*, mutilated cervix uteri. *e*, urethra.
The natural size of the fistulous opening is represented.

in the manner already described in connection with the primary operation for the division of cicatricial bands. The calibre of the urethra, which was impervious, was restored by incising its vesical extremity with a narrow-bladed knife passed along the canal upon a grooved director. The borders of the fistula were then pared and brought

together by eight silver interrupted sutures secured by the button as shown in Fig. 43. Coarse, stiff wire (No. 24) was employed, as has always been my practice, so that the borders could be coaptated along their entire length and retained in perfect apposition by merely shouldering the sutures by means of my suture adjuster (Fig. 4). In this way the exact degree of traction which should be exerted on each suture can be accurately determined and the adjustment of the button is made more easy. The sutures on either side of the right ureter were passed about two-thirds of an inch from

FIG. 43.




The fistula closed by the Button Interrupted Suture.
(Knee-chest position.)
*e*, meatus urinarius, *d*, ureteral catheter, to the extremity of which is connected a soft-rubber tube, and *g*, soft vesical catheter, draining respectively the left and right kidneys; both are secured in place by a thread uniting them to the elastic tube *h*, enclosing the sutures. The orifice of the left ureter lies in the bladder, beneath the first shot, and that of the right between the 6th and 7th sutures. The various curves imparted to the button, in order to make it conform to the stump of the cervix, and the uneven lines of coaptation, are imperfectly represented by the shading.

each other, in order to avoid all danger of obstructing the duct. Along the remainder of the line of coaptation they were placed about half an inch apart, except immediately to the left of the cervix, where the tension was greatest. Here the sutures were separated along the upper border of the opening only by about $\frac{3}{16}$ of an inch. Occlusion of the ureter was guarded against on this side by passing a small flexible English catheter No. 4 through the urethra, across the bladder and into the duct for about six inches.

The wires were left long, in order that they might be loosened in case there occurred any symptoms of obstruction of either of the ureters. To prevent irritation of the mucous membrane of the vagina, they were bent so as to lie in contact with the button, and passed through a soft-rubber tube, as shown in the accompanying figure. A soft catheter was placed in the bladder. The vesical as well as the ureteral catheter was secured in place by tying it opposite the meatus urinarius to the wires, the ends of which extended out of the vagina.

The greatest difficulty in this operation was encountered on the left side of the fistula. Here, as will be seen by referring to Fig. 42, which shows the form of the opening, the upper and lower borders did not meet gradually, but the loss of tissue extended abruptly from a point opposite to the vesical extremity of the urethra to one on a line with and to the left of the cervix uteri. The difficulty of securing coaptation was further increased by the fact that the lower border of this part of the fistula lay on a lower plane anterior to that of the remainder of the opening. These peculiarities led me to modify my usual method of operating. Instead of dragging the uterus directly downward and attaching it to the urethra, it was drawn down obliquely and the stump of the cervix (see Fig. 43) was utilized to fill the space on the left where the loss of tissue was greatest. The difficulty in adjusting the button, resulting from the unevenness of the line of coaptation, was overcome by bending it upon its concavity, so as to make it conform accurately with the surface beneath.

The ureteral catheter was removed at the end of twenty-four hours. It had caused no inconvenience. The vesical catheter was kept in place during the week following the operation, aud for several days after the sutures were removed. The urine was retained until the fifth day, when it began to escape into the vagina. Seven days after the operation the sutures were removed. Union was perfect except at a point a little to the left of the cervix, where an opening sufficiently large to admit the end of the little finger was left. The position of the opening corresponded to the second suture, (counting from the left), which was passed, as has been stated, very close to the third. The cause of failure at this point was due to the formation of a small slough. The closeness of the sutures in this situation probably interfered with the blood supply along the upper border of the fistula, which was composed of cicatricial tissue deficient in vitality. Tension may also have contributed to this result. Coaptation at this point was opposed, not only by the retrogressive force of the uterus, but also by the traction of the sutures on the opposite side of the vagina, tending to draw the cervix toward the median line. During the twenty-four hours following the removal of the sutures, slight separation of the borders took place and the opening enlarged somewhat. The cicatrix is now, four weeks after the operation, firm and the fistula barely admits the tip of the index finger. It is situated a little to the left of the cervix and internal to the ureter, the orifice of which is partly hidden from view by the line of union. The borders of the opening can be brought together, and its closure by a second operation will be easily effected.]

Encouraged by my cure of the pyelitis in this case, I conceived the idea of extending the method of treatment to cases of pyelitis when no fistulous opening existed. Fortunately, I soon had an opportunity. Mrs. B. came under my care. She gave a history of symptoms similar to those already described. Hæmaturia formed a marked feature of the case, and had continued for two and a half years. The pelvis of the right kidney was suspected, from the location of the pain, to be the seat of the disease. In order to expose the right ureter, May 6th, 1887, I made an opening in the bladder at the point where it pierces the vesical mucous membrane.*

The name which I suggest for this new operation is kolpo-uretero-cystotomy; it is

* See Fig. 33 and note on page 543.

appropriate because it corresponds with the established nomenclature, and serves to distinguish the operation from kolpo-cystotomy, done for cystitis, and kolpo-ureterotomy, which may be done in future.

When the orifice of the ureter was thus exposed, blood was seen exuding from it. The ureter having been made accessible, the subsequent treatment was the same as in the previous case, and the result equally fortunate. The discharge disappeared in a few weeks. The use of my utero-vesical drainage support prevented all inconvenience from incontinence of urine, and made the patient so comfortable that haste in closing the opening was considered unnecessary. She was, therefore, sent home to Charleston, and instructed to return for this purpose when she was stronger and fully restored to health.

She wrote me, on August 12th, the following report of her condition: "The drainage works perfectly. There is no escape of urine, except sometimes a little while lying down. I do not suffer from any irritation whatever. The instrument keeps the uterus in position. I have not suffered any pain in the kidneys. I feel better than I have for years. I have just been weighed; so will acquaint you with the numbers—one hundred and nine pounds, having gained nineteen pounds in three months (that is, since the operation). I am able to attend church services. I can either ride or walk. Neither gives me any uneasiness. My friends look at me, and speak of my improvement with astonishment."*

## SECTION IV.—CONCLUSIONS.

All the complications of gravity of urinary and fecal fistulæ having now been studied, what I have already said may be, in conclusion, enforced, by a brief summary of certain important facts and principles, and an enumeration of the results that I believe may be secured by the employment of the methods of treatment which I have described.

1. The importance of the complications has not been duly appreciated. They form, in many cases, the principal difficulty in the way of the successful performance of the operation for the closure of the fistulous opening. In other cases, when the fistula is cured, but the complications left without treatment, they lead, sooner or later, to suffering or to the death of the patient. The greatest care should, therefore, be taken to discover and to remove them.

2. Kolpokleisis, occlusion of the os uteri and incarceration of the cervix in the bladder or rectum are unjustifiable operations. They destroy the functions of the genital organs and lead to cystitis, the formation of renal and vesical calculi, pyelitis and other grave diseases. Moreover, they are unnecessary operations. By means of the gradual preparatory treatment of the complications, and by the aid of my button suture and dilating speculum, I have been able to overcome all the difficulties which have been described as indications for their performance.

3. The association of drainage with dilatation of the vagina is a great improvement. The inconvenience and evil effects of incontinence of urine are thereby lessened, and the duration of the treatment is shortened, by the more rapid healing of the incisions and the formation of less cicatricial material in the reparative process.

4. We now possess a means of palliating the suffering due to incontinence of urine in the small percentage of cases of fistula which are incurable by any method, even the dangerous one of kolpokleisis. I believe some form of drainage instrument may be adapted to every case, and these patients may be thus restored to the enjoyment of life and the performance of its duties.

5. The possession of a means of draining the bladder will widen the scope of the

* Fistula closed Dec. 4th, and patient discharged, perfectly cured. *Am. Journ. Med. Sciences* for March, 1888.

operation of kolpo-cystotomy, done for cystitis, by removing the evils of incontinence of urine, now the chief objection to its performance.

6. Finally, I believe the operation which I have called kolpo-uretero-cystotomy, followed by the exploration and treatment of the diseases of the ureter and pelvis of the kidney, has a brilliant future of usefulness before it. In the treatment of pyelitis, renal calculi, and other obstructions of the ureters, it will restrict within narrow limits the operations of nephrotomy and nephrectomy.

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The Secretary, Dr. CUSHING, read for the author, Dr. THOS. MORE-MADDEN, Dublin, a paper, entitled—

## ON THE TREATMENT OF STERILITY IN WOMEN.

### SUR LE TRAITEMENT DE LA STÉRILITÉ CHEZ LES FEMMES.

### ÜBER DIE BEHANDLUNG DER STERILITÄT BEI FRAUEN.

MR. PRESIDENT:—I venture to submit the following observations on the etiology and treatment of infecundity in women, chiefly as some evidence of my recognition of the debt which every physician owes to his profession, and of which he can only hope to acquit himself by contributing his mite, however small its value may be, to the advancement of the science of medicine. In offering these remarks for the judgment of the members of the Gynæcological Section of the International Medical Congress, who, from every part of the world, are now in Washington, assembled on a brief pilgrimage, as to the Mecca of their art, to the Capital of this great birth-land of modern gynæcological science, I may premise that the views expressed in the present communication are based on a clinical experience extending over a period of upward of twenty years in hospital and consultation practice.

There are few gynæcological questions that come more frequently under consideration, or that may be of greater practical importance, than those connected with the subject of this paper—involving, as these do, not only the physical health of our patients, but also, in many instances, intimately affecting their social interests and the happiness of married life. For, at least in the country wherein my practice lies, the vicious doctrines of the Malthusian school are, fortunately, in no wise generally accepted in lieu of the Christian view of the main functions and end of woman's married life.

#### ETIOLOGY OF INFECUNDITY.

As in every other morbid condition, so in the treatment of sterility, our first aim must be to ascertain the cause of the trouble for which we are consulted, and our second object, to remove this, if it be possible to do so. Of the various causes of barrenness, some, as, for instance, the absence or arrested development of the organs essential for conception, viz., the uterus, Fallopian tubes or ovariæ, being beyond remedial reach, need not here occupy our consideration. In the great majority of instances, however, sterility occurring in women within the limits of ovarian functional vitality, admits of effectual treatment when that treatment is rationally directed to the special exigencies of each case.

By most authorities on this subject, including even the late Dr. Marion Sims, female sterility, or reproductive inability, has been confounded with impotency or sexual incapacity. Hence, it may not appear superfluous to remind my hearers that, properly speak-

ing, the latter term should be restricted to those cases in which marital intercourse is prevented by some physical impediment or malformation in the female genital tract, such as vaginal or vulval occlusion, imperforate hymen, vaginismus, cervical stenosis, etc., by which impregnation may be; while sterility or imperfection of conceptive power is due to either some structural lesion or deficiency of the organs essential to conception. Thus, the uterus, Fallopian tubes or ovariæ, may each be absent or abnormal, or else, these parts being in a normal condition, the patient, nevertheless, remains sterile, either from constitutional or other causes—such as sexual irrespondence, or incongruity of a normal rather than of a physical nature.

### STENOSIS OF THE CERVICAL CANAL.

This is not only the most frequent of the causes of sterility, but is also, according to my experience, the most amenable to appropriate treatment of all the physical factors in the causation of infecundity. Until a comparatively modern period, however, atresia of the cervical canal was generally regarded as irremediable, and this opinion continued to prevail very generally for years after the period when Dr. Mackintosh, of Edinburgh, by his revival of the ancient but long-discussed method of dilating the cervical canal when occluded, proved the curability of that condition. Practically, however, the modern treatment of cervical stenosis was initiated a quarter of a century later, when Simpson brought the subject prominently before the profession; and not until then was the feasibility of treating stenosis by incision with the metrotome, as well as by dilatation with sponge and laminaria tents, recognized. This, however, is not the place to trace the progressive history of the improved procedures by which the crude operations resorted to half a century ago, in the treatment of obstructive dysmenorrhœa and sterility, have been now replaced. My present object is a more practical one. Believing, as I do, that although dilatation or incision of the cervix may be successfully employed in many cases, either of these methods *per se* very often fail in permanently so far overcoming the natural contractility of the cervical structures as to prevent a recurrence of the stenosis, I now desire to call attention to a method of procedure, by the use of certain instruments, by which the walls of the cervical passage are so forcibly and widely separated and torn, rather than cut apart, as to obviate the risk of their speedy reunion and recontraction.

### OPERATIVE TREATMENT OF CERVICAL STENOSIS.

It might, perhaps, appear superfluous before, such an audience as I have the honor of addressing, to re-describe so trite a matter as the surgical treatment of stenosis. However, as the method I employ differs in several respects from that generally adopted, I may here be permitted to refer to its details. I may add that my practice in these cases is founded on a somewhat exceptionally large experience, as during the past ten years alone I have operated in five hundred and seventy cases of stenosis; and during the past winter and summer session I have thus treated in my hospital no less than eighty-two such cases, in many of which I have had the able assistance of my friend, Dr. Duke, obstetric physician to Steeven's Hospital.

If possible, this operation should be undertaken a few days after the termination of the menstrual period, and it should be preceded by daily hot-water syringing for some time. To proceed with any comfort to ourselves or advantage to our patient in these cases, the patient should be placed under ether or methylene, and be fixed in the ordinary left lateral semi-prone position, on a proper gynæcological couch or table. In the first place, the cervix being exposed by the duck-bill speculum, the anterior lip is seized by a strong vulsellum, and drawn down by an assistant as close to the vulva as possible, where it is to be retained. Then the sound may be passed, to ascertain the physical condition of the uterus, as well as the immediate permeability of the canal;

or, if this cannot be introduced (as happened in a case of stenosis on which I recently operated in England), a very small, flexible probe may be passed, and followed by a larger one, until the ordinary uterine sound can be introduced. This being removed, I then pass in, up to the fundus, my uterine director, which is a long, probe-pointed instrument, with ball and rachet adjustment in the handle, and rather less bulky than the common sound, and then along the groove of this uterine dilator, passed up through the os internum, I run the button of my triangular-guarded, blunt, serrated-edged knife, with the cutting surface directed backward until it enters fully into the uterine cavity. It is there rotated and withdrawn in the opposite direction. The edge of this instrument is thick and somewhat blunted, so as to crush apart or tear, rather than sharply divide, the parts through which it is forced. The objects of this construction are, of course, to diminish the risk of hemorrhage at the time, and to retard the subsequent apposition of the separated surfaces.

These instruments have now been used in eighty-two cases, with satisfactory results, in my hospital, during the past session. But for upward of twenty years previously I have employed, and in some cases still use, for this purpose, Simpson's original metrotome, which I regard as a far better instrument than any of the more recent metrotomes, and in every respect superior to Sims' or Emmet's or any other intra-uterine knife.

Whether the metrotome or my knife be used, I think matters little, at least when compared with the importance of maintaining the permanent permeability of the passage, and I think that this object may be best secured by the use of my dilator.

Immediately after the completion of the incision, I employ this instrument, not merely with the view of thoroughly expanding the canal and its orifices in the most effectual manner possible, but also for the purpose of tearing the divided vessels, and thus arresting any excessive hemorrhage from the circular artery. The extent to which this dilatation may be carried must, of course, be largely determined by the special circumstances of each case. As a rule, however, in ordinary cases, I pass the instrument well into the uterine cavity, and then, by means of the screw-adjustment, separating the points to their full extent (*i. e.*, one inch and a quarter, and then not reducible by any external pressure to less than three-quarters of an inch), I withdraw the expanded blades forcibly through the canal, reintroducing it, and repeating the same manœuvre in opposite directions until the passage is so expanded that I can readily pass my index finger into the uterine cavity, which is then thoroughly washed out with a hot carbolized injection. In the next place, I pack the cervical canal with a long tampon of compressed absorbent cotton, saturated with dilute glycerine of carbolic acid, and fill the underlying vagina with a large glycerine plug. The latter is removed in twenty-four hours, and the former in sixty hours, if not sooner expelled, being then replaced by a large-sized soft rubber stem, also previously well carbolized, which I direct to be worn, if possible, until the next monthly period passes over. For ten days or a fortnight after operation the patient should be kept in bed, and the uterine cavity daily washed out by the operator or his assistant, with hot water, plain or medicated. Before allowing the patient to leave her bed, or resume, gradually and cautiously, as this should be, her ordinary mode of life, I also invariably, irrespective of any flexion or displacement, secure the uterus *in situ*, and lift its weight off the ligaments by a properly adjusted Hodge pessary, which not only occasions great comfort to the patient, but also to a considerable extent obviates the possible occurrence of pelvic cellulitis, and other after troubles that might otherwise be consequent on this operation. Moreover, I desire the patient to remain in bed during the succeeding menstrual period, which is generally attended with some pain and increased discharge. She should then wear a soft-rubber stem until the approach of the following period, after which, and never sooner, she may return to marital intercourse.

These precautions and directions may, perhaps, be regarded as superfluous concern-

ing an operation such as that now under consideration, which has been described, by some who ought to know better, as "one of the simplest and safest of all gynæcological procedures." This, certainly, is not my opinion, and I ascribe the success which has attended my treatment of stenosis entirely to their adoption. For although any tyro, armed with a metrotome, may possibly lay open a contracted cervical canal easily enough, the operation will probably prove worse than useless if it be rashly and needlessly undertaken, or carelessly performed, being extremely apt to be followed by ill consequences, such as hemorrhage, pelvic cellulitis, endometritis, and, above all, by permanent cicatricial occlusion of the canal, when thus abused by those who disregard those details and precautions which are essential for its safe and successful accomplishment.

### VAGINAL APHORIA.

In relation to the causes of sterility the condition of the vagina is a consideration of importance, it being obviously necessary, for impregnation, that this canal should be capable of receiving, retaining and transmitting the seminal fluid. These requirements may be defeated by various abnormalities, congenital or acquired. Thus the vagina may be wholly absent, as I have seen in one instance in which the urethra opened directly on the perineum. But as such cases are fortunately of extreme rarity, as well as incurable, they may be here dismissed without further consideration. The vulvar orifice may be occluded by adhesions or plastic exudations in cases of vulvitis; or the vaginal canal may be so abnormally shaped as to render complete intercourse impossible. Of this malformation I have met with but a single instance in an experience of upward of a quarter of a century, while of the same result from narrowing of the canal, I have met several cases, all of which proved amenable to treatment.

A more frequent cause of vaginal impotency is cicatricial occlusion of the canal by membraneous septa consequent on former parturient injuries or subsequent inflammation, of which I have recorded several cases, one of which is at present under my care in the hospital.

### INFECUNDITY FROM VAGINISMUS.

Conceptive incapacity, or female impotency, is in many instances traceable to vaginismus or excessive sensibility of the vaginal orifice and adjacent parts, attended with such spasmodic contraction of the sphincter vaginæ as to form an impediment to marital intercourse. This occurs chiefly in patients of a hysterical temperament, and is generally occasioned by neuromata, confined to the parts supplied by the superficial perineal branch of the pudic nerve. From clinical experience I can vouch for the possibility, in many cases, of relieving the most intense dyspareunia thus caused, without any operative interference beyond the forcible dilatation of the vaginal canal, and stretching the pudic nerve implicated by the disease. The method of effecting this I have elsewhere described in a memoir, in which, while giving primary importance to local treatment, I at the same time laid stress on the importance of conjoint employment of topical measures with that constitutional sedative treatment which is always indicated in these cases, as in all other local manifestations of constitutional, nervous, or hysterical disorder. In some instances, however, these means fail, and we must then fall back on Sims' or Emmet's operations for the cure of vaginismus. It, however, sometimes happens that even in cases of vaginismus so intense as to render complete marital intercourse impossible, the disease is not necessarily a barrier to impregnation. Thus, in one instance under my observation, so extreme was the local hyperæsthesia as not only to preclude the possibility of complete cohabitation, but also to prevent the patient submitting to any local treatment for relief of the morbid condition. Nevertheless conception occurred, and I subsequently was called in to deliver her at full term, and in doing so was obliged to incise the still unruptured hymen, by which delivery was obstructed.

### STERILITY FROM UTERINE FLEXIONS.

The various displacements of the uterus by which sterility can be occasioned have been so fully discussed by recent writers as to render any lengthened reference to this point superfluous in this place. For my own part, I am inclined to think that a very extreme degree of importance is attached by Dr. Graily Hewitt and his followers to the influence of anteversion and flexions in the causation of infecundity. In my own experience, at least, I have not often met with cases of sterility assignable to anterior deviations from the normal position of the uterus, and I have seen early pregnancy coexistent with the most marked anteflexions. On the other hand, I have often traced sterility to retroversion, and again, and more frequently, to retroflexion, by the latter of which not only is the permeability of the canal mechanically constricted, at the point of flexion, but, moreover, as in cases of retroversion, and also of prolapsus uteri, the vaginal retentive capacity is necessarily interfered with. In each and all of these three latter I have generally found the reposition and maintenance *in situ* of the uterus by a properly adjusted Hodge pessary, *per se*, to be sufficient to cure the sterility thus occasioned. Nevertheless, the operation of opening by incision and dilatation the cervical canal is still useful, in certain cases of flexion of the uterus, with elongation of the cervix, where, from long-continued pressure at the angle of flexure, such an absorption of tissues has taken place as to occasion a permanent morbid condition incompatible with impregnation. In such cases the result of incising the cervix, which should always be divided backward, is, as Dr. Emmet observes, to bring the neck of the uterus to a more natural length, and it then becomes straighter, shorter and thicker. This change in the neck is brought about, it is supposed, by the action of the longitudinal fibres, after the circular ones have been divided. The course of the muscular fibres of the cervix is not so well defined as in the body of the uterus, being more matted together; consequently this explanation may not be accepted without question. But of the result there can exist no doubt. We will, therefore, leave the question to be determined by others, whether the result is produced by contraction of the cicatricial surfaces of the divided cervix, opposite the flexure, or by muscular action.

### ENDOMETRITIS AND STERILITY.

Chronic endometritis is incompatible with fecundity, and so long as that disease exists to any serious extent the patient must remain barren. This fact, to which I called attention many years ago, is one of great practical importance, and is too generally ignored in practice. I have known many instances in which patients were subjected to active surgical treatment to overcome some supposed mechanical obstacle to impregnation, and who, nevertheless, remained childless, no attention having been paid to the true and most frequent cause of sterility, namely, the existence of chronic cervical inflammation, on the subsequent cure of which pregnancy has followed. In such cases not only is impregnation obstructed by the viscid, glairy secretion by which the os and inferior segment of the cervical canal is sealed in all cases of endocerviciti but also, as Mr. Whitebread long since pointed out, the inflammatory action going o within the uterus, and which is liable to be aggravated under the states of venere excitement, may prevent the formation of the membrana decidua; and the ovum, eve though impregnated, is necessarily thrown off without any manifestation of its exi ence in the fertilized state. Secondly, the diseased condition of the lining membra of the uterus may be extended to the fallopian canals, obliterating for a time the internal orifices, so as to oppose a complete barrier to the admission of the sperma fluid within them, and thus to render the fertilizing effort abortive. Thirdly, t nature of the secretion furnished by the internal surface of the uterus or of the vagi under certain states of the disease, may be inimical to the active existence of the sp matozoa, occasioning their destruction before they arrive at the extricated ovule.

I may venture here to reiterate two of the conclusions on this subject which I published fourteen years ago, in the first volume of the *Dublin Obstetrical Transactions*, and which have been confirmed by more recent experience, viz.: 1st. That a congestive hypertrophy of the uterus, and more especially of the cervix uteri, is a very common cause of sterility; 2d. That these conditions are, in the majority of cases, occasioned by constitutional causes, one of the most frequent of which is the scrofulous diathesis; 3d. That these diseases require constitutional as well as local treatment; and I would again urge the benefits derivable in these cases from the use of the mineral and thermal waters I have elsewhere spoken of.

### OVARIAN AND TUBAL STERILITY.

Ovarian inflammation, manifested by soreness, tumefaction, and occasionally burning pain in the ovarian region, is one of the most frequent consequences and accompaniments of endometritis. In these cases the inflammation extends from the uterus, along the fallopian tubes, to the ovaries, and this to a great extent accounts for the fact I have just mentioned, that patients, while suffering from endometritis or endocervicitis, are invariably sterile. Moreover, in cases of endometritis the consequent salpingitis is generally attended by a viscid exudation, by which the tubes, and especially their uterine orifices, are mechanically sealed against the possibility of impregnation. Independently, however, of its frequent sequence on endometritis, tubal obstruction, productive of dysmenorrhœa and sterility, may also arise from those possibly graver, but, according to my experience, comparatively exceptional, diseases, the frequency and pathological importance of which appear to me to be now strangely over-estimated, and in the treatment of which operative procedures, involving loss of all future conceptive ability, *i. e.*, the complete removal of the uterine adnexa, are so readily resorted to. In not a few cases I have seen all the supposed symptoms of pyosalpinx subside completely without any surgical interposition whatever.

It would seem to me quite as rational to amputate the breast for an ordinary mammary abscess as to remove the fallopian tubes merely because they may be the seat of serous or purulent exudations. In many cases of the latter there is, as I can vouch from clinical experience, no impossibility of reaching and removing the collection, whether a hydro- or a pyosalpinx, by aspiration, or in some instances by catheterization of the diseased fallopian tube.

Many years ago, having occasion to use the sound in a patient suffering from dysmenorrhœa and a long time sterile, I was surprised, there being no enlargement of the uterus, to find the sound pass in up to the handle, and that it had obviously entered the right fallopian tube. A year subsequently that lady gave birth to her first child, after eight years of married life. Since then I have repeatedly succeeded in accomplishing what, in the first instance, was but a happy accident, and more than once with a similar result. Hence, I invariably endeavor to impress, by clinical demonstration, on those who attend my hospital practice, the too-generally ignored fact that the catheterization of the fallopian tubes, when employed by a practiced hand, and with due caution, is a feasible, and, in some instances, may prove an effectual, method of treating certain cases of dysmenorrhœa and sterility otherwise incurable.

Sterility may also arise from causes irrespective of any physical lesion. And although impregnation obviously in no wise depends on any sexual desire, still, unquestionably, it may be prevented by strong mental emotion and personal dislike, or even by sexual incongruity, which, in some instances, however, is not dependent on any aversion. Thus, in two cases I have been consulted, after some years of childless married life, by ladies happily married, desirous of offspring, and not suffering from any physical disability, who informed me that though attached to their husbands, not only was there absolutely sexual indifference, but even positive repugnance to coition, which, in one

instance, produced absolute nausea. In the latter case, I may add, that the last-mentioned symptom was allayed by the use of cocain suppositories before intercourse, and that ultimately pregnancy resulted.

Still more commonly is sterility dependent on sexual abuse or abnormal irritation, and hence the general sterility of prostitutes. It is hardly necessary to observe that in such cases a long period of abstention from all sexual stimulation affords the only hope of remedying the *impotentia generandi.*

In cases of infecundity, independent of all local disease, malformation or displacement, or of any obvious derangement of the general health, or other tangible cause, and in which the mineral waters already referred to have either been tried without benefit or are contra-indicated or not available, a course of sea-bathing is a prescription the efficacy of which in such cases I learned many years ago from a veteran obstetrician, the late Dr. McKeever. Why or how sea-bathing should have any special effect in this way I know not, but I can vouch for the fact that in many instances of sterility of long duration, the cause of which I had failed to discover or to remedy otherwise, impregnation has dated from a course of sea-bathing during a visit to Brighton, Bray, or some other seaside sanatorium.

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Dr. A. CORDES, of Geneva, read for the author, Prof. VULLIET, M. D., of Geneva, a paper

## ON THE DILATATION OF THE UTERUS BY PROGRESSIVE OBTURATIONS.

### SUR LA DILATATION DE L'UTÉRUS PAR DES OBTURATIONS PROGRESSIVES.

### ÜBER DIE ERWEITERUNG DES UTERUS DURCH PROGRESSIVE OBTURATIONEN.

This method allows one to see the interior of the uterus, and to keep the organ at any degree of dilatation which may be desired. All the methods which have been used to see the interior of the uterine cavity have not well accomplished the objects aimed at, but in an imperfect way and in some quite exceptional cases. Neither the special instruments, nor the different kinds of illumination as yet proposed, can be considered as having well solved the problem of uterine endoscopy or diaphanoscopy. On the other hand, no method of dilatation now in use produces a dilatation which it is possible to maintain but for a short time, or which enables us to regain it, on account of the dangerous complications to which the methods give rise. Accurate diagnosis in the local treatment is, therefore, very difficult.

The uterus can be dilated in two ways, one of them artificial, which is the one we will describe. This depends on the degree of extensibility of the parietal tissues. The other kind of dilatation, which is spontaneous, is either physiological or pathological, and is induced by the growth in the uterus of any tumor or of a fœtus. In that case the uterus not only increases in size, but undergoes a kind of symmetric hypertrophy.

In 1883 I presented a method of dilatation by which I distended the uterine wall and at the same time induced plastic modifications analogous to the one which th

uterus undergoes in spontaneous dilatation. I call this method, "Method of Dilatation of the Uterus by Progressive Plugging." It consists in two things: first, to obturate the uterine cavity by some stuff which cannot cause traumatism nor infection; secondly, to increase gradually the volume of these foreign bodies. In that same year, 1883, I had the idea of plugging the uterine cavity for disinfection. I noticed that the plugging expanded the uterus. This was the origin of my method. The plug which I used at that time was cotton-wool, which is, among dressing materials, the least irritating and the easiest one to compress and introduce under a small size. Besides, it may be well impregnated with antiseptic material.

Some antiseptic material, being liable to dissolve rapidly, could not be used for plugs which must remain in a profusely secreting organ. I selected iodoform, the effects of which are very slow. Sometimes it produces intoxication. Then I tried salol, and then terebene mixed with equal parts of olive oil. My plugs were made of antiseptic cotton-wool. The small ones, when not compressed, are of the size of a small Lima bean, the large ones the size of a walnut. They are attached to a double thread. I soak them in a solution made of iodoform, and then let them dry. The ether evaporates. Then iodoform remains uniformly deposited on the surface of the plug, owing to the filtering properties of the cotton-wool. The iodoform remains entirely on the surface. If a plug be cut through, its inside will be seen to be entirely white. In proportion as the quantity of iodoform is increased by introducing more and more plugs into the uterus, the solutions which are used must be weakened. My solutions vary from one part of iodol in ten of ether to one in thirty. The plugs must, in no case, be used when they are wet. The contact of ether is very painful and irritating. Iodoform is in excess in them. Besides, it is dissolved; *i.e.*, in a condition which causes it to be absorbed too rapidly and excessively. Sometimes, in cases where the prepared plugs are not at hand, I soak the cotton-wool in a solution of iodol and ether, and then revolve them quickly in the air, so as to dry them. I keep my plugs in well-corked bottles, with labels on them denoting the strength of the solution.

I place the patient in the genu-pectoral position. Then I explore the uterine cavity, so as to determine its size and direction. If it is narrowed, tortuous or flaccid, the operation must be postponed until it is straightened or dilated.

This preliminary dilatation can be effected by the ordinary methods. After some sittings we obtain a sufficient permeability to be enabled to continue dilatation by the proceeding above mentioned. A pair of curved dressing-forceps, long and slender, is used to hold the plug within the external os, and then to conduct it to a certain depth in the cervix. Sometimes the plug becomes coated with mucus, which makes it slippery, when it is forced out by uterine contraction. In that case we must use plugs one after another until the uterine cavity is well swabbed out. When the plug is well located in the cervix, I push it up higher with the catheter. After the first plug is in position, a second and a third one is introduced, and so on until the uterine cavity is well filled up. I let these plugs remain for forty-eight hours, and, generally, they do not occasion any inconvenience. The patient is not even obliged to keep in bed. I do not, however, permit her to stand up for any length of time or to take violent exercise, but only to walk quietly about the room. After forty-eight hours the uterus is softened, and its cavity is enlarged. I then take out all the plugs and immediately introduce another set.

If we propose to make only a digital examination, a uniform dilatation of the uterus will be sufficient; but if we wish to see the whole uterine cavity we must try to produce a distention which is wide at the entrance. For that purpose we must, at the outset, dispose the plugs in such a way that their agglomeration forms a cone, the apex of which looks on the fundus uteri. When the uterine tissue is not altered, it takes longer time to obtain dilatation of the inferior segment than of the superior segment. The resist-

ance is sometimes such that obturation cannot overcome it. Then I use a bunch of laminaria or tupelo. In the centre of this bunch I put a soft plug of cotton, which I push up until it is about the middle of the cervical canal. After several such sittings, the dilatation is large enough to enable us to see the fundus uteri. Six or eight such pluggings—that is to say, from fifteen to twenty days—are generally sufficient to obtain the required degree of dilatation.

Generally speaking, one may say that when a large dilatation is indicated, access to the uterine cavity is easy, either because the walls are softened, or because they have been partly destroyed or thrust aside by the pathological process itself. It generally takes longer time to obtain the small dilatations, because they fit cases in which there is no spontaneous anterior dilatation. The dilatation goes on very quickly in the case of patients affected with ulcerated cancer of the cervix, parietal or sessile fibromas, vegetating endometritis; that is to say, in cases where it is most useful. It is very much longer when the uterus is distorted or narrowed, without its tissue being altered in its consistency.

In one case of narrowing of the cervix I could not obtain complete dilatation until after six weeks. I must add that I would do it again. I only did it as an experiment. I had made a speculum especially for the dilated uterus. If the uterine cavity is occupied by a growth, such growth must be removed by the curette.

The uterus endures the plugs very well. It very rarely reacts, and when the reaction is produced, it is indicated only by moderate colic pains, never by expulsive pains.

I have seen three patients present gastric troubles similar to those which come in the beginning of pregnancy. In two cases the plugging has produced an abating effect on nervous chronic symptoms, exactly as we observe these symptoms abated by pregnancy, and as in hysterical women the nervous symptoms are also diminished by pregnancy. The dilatation has never produced any septic accident, but quite the reverse; it has put a stop to them, or, at least, greatly lessened them. It is really hæmostatic.

## CONCLUSIONS.

1. This method solves the problem of endoscopy. It enables us to diagnose, to dress, to operate, to watch the consequences which follow the operation up to the most remote parts of the uterine cavity.

2. It is a very excellent antiseptic dressing.

3. We obtain by it a permanent instead of a very brief dilatation, which gives us al the time required for any kind of dressing which we may desire.

4. It induces hyperplasia of the wall, which may be of much service in every cas where plastic modifications are desirable.

5. It acts in a favorable way on the neurosis coming from the uterus, in the sam way as does pregnancy. This method is, I must confess, rather slow; but the slowne of the method is its very essence, because it brings on the artificial production of th same kind of dilatation which leads to the expulsion of the fœtus and sometimes uteri tumors. Besides, to make good gynæcologists we must not be in a hurry. Guim said: "Un opération pressé est un opération dangereux."

Dr. Wm. H. Wathen, Louisville, Ky., read a paper on

# RAPID DILATATION OF THE CERVIX UTERI.

## DILATATION RAPIDE DU COL DE L'UTÉRUS.

## SCHNELLE ERWEITERUNG DES CERVIX UTERI.

BY WM. H. WATHEN, M.D.,

Of Louisville, Ky.

Having learned, from experience and observation, the bad results obtained in efforts to dilate the cervical canal with tents, or to enlarge or straighten the canal by incisions, to cure dysmenorrhœa and sterility, I was pleased at the substitution of a method more satisfactory; so I beg to call your attention to rapid dilatation by the bi-valve or double-bladed metallic dilators, such as are now used by many learned operators of this country with better results and fewer complications than by other means.

Tents may be indicated in some instances, but I can hardly imagine a case where they would be preferable to the metallic dilators in operations to cure dysmenorrhæa and sterility. The prognosis is not encouraging in the use of tents, and the good results sometimes apparently obtained are usually temporary. Tents are not easily introduced, frequently cause serious complications, and dilate imperfectly and slowly, often requiring several days to complete the dilatation. Endometritis, pelvic hæmatocele, pelvic cellular or peritoneal inflammation, septicæmia, pyæmia and tetanus are some of the dangers accompanying or following their use. These complications are encountered when we least expect them, and no one of much experience in the use of tents has failed to have his share of trouble, as the most rigid antisepsis is not a preventive in all cases. The tupelo tent is superior to any other material; it is less likely to cause septic infection than the sponge, and dilates more rapidly, regularly and better than the sea-tangle.

The two-bladed dilators are relatively aseptic, are easily used, complete the dilatation at one sitting, and the operation is comparatively free of immediate or subsequent dangers; it nearly always cures the dysmenorrhœa, and often removes the cause or causes of sterility. Briefly, the above has been the experience of the best workers in the field of gynæcology. The results of incision of the cervix up to the vaginal junction, or through the os internum anteriorly, posteriorly or bilaterally, has been even more unsatisfactory than those following the use of tents. The operation seldom cures, the woman has serious complications, and sometimes it causes a pathological condition of the cervix that demands trachelorraphy, just as in laceration following labor. The graduated steel bougies possess no advantage over the double-bladed instrument; the treatment is tedious and protracted, the complications comparatively frequent, and any good results generally temporary. I have operated many times with the two-bladed instrument, and have had uniformly good results, with no complications. This has been the experience of Goodell, Mundé, Gill, Wylie, Goelet, and nearly every one who operates after this fashion.

I have no concern about dilating the cervix in my office practice, without local or general anæsthesia, to the extent of one-third of an inch to half an inch, the patients leaving immediately to walk or ride to their homes. They seldom suffer much pain during the dilatation, and in a few minutes afterward are free of pain, and never have any serious complications. The dilatation should not be done if there is inflammation of the uterus or the pelvic cellular or peritoneal tissue, or if there is much tubal or ovarian trouble, nor until the vagina has been thoroughly cleansed and the instrument

disinfected in pure carbolic acid. In dilatation from three-quarters of an inch to one inch and a quarter, chloroform should be used, but not to the extent of profound anæsthesia. The patient should be carefully prepared for the operation, which should be done about ten days after the menstrual period; a hypodermic of morphia and atropia should be given just before the administration of chloroform. It is best to put the woman on her back and use a large bi-valve speculum, but a Sims' speculum may be used with the woman on her left side. I never begin an operation without three dilators of different sizes, but it may not be necessary to use but two of them. I hold the cervix firmly with this little tenaculum, and use the smallest instrument to prepare the way for the larger ones; possibly the intermediate size may be first used, or the smallest may dilate enough to admit the largest dilator. The uterus tries to slip away from the dilator as it expands, but this is easily prevented by the tenaculum, with the dilators I use. In my experience this difficulty is increased with Goodell's Modification of Ellenger's dilator, and is not overcome by its roughened blades. Appreciating this, and for other reasons, I devised this large instrument. It is claimed for Goodell's dilator, that the blades being parallel, it dilates all parts of the canal equally. This is true in theory only, for the elasticity or yielding of the blades is greatest at the ends, while the greatest resistance is in the upper part of the cervix, so that when the external os is dilated one inch and one-eighth the internal os is dilated not more than an inch. The reverse should be true; for the part that most needs to be acted upon is generally near

the uterine body. This dilator is more powerful, less complicated, and will not slip out of the uterus so easily when expanding, and when it dilates the external os seven-eighths of an inch, the internal os will be open about an inch. We should not dilate too rapidly, lest we lacerate the cervix, nor should we dilate a small cervix as much as we would a large one. When the woman begins to come from under the influence of chloroform, and feels pain from the presence of the instrument, it should be loosened and gently withdrawn. The results are probably better if the canulated intra-uterine stem is inserted just after the operation or during the second day. The woman should be kept in bed for a week, and the vagina should be washed out with hot water daily. Sexual intercourse should be proscribed for a month, and the woman should carefully avoid everything that tends to disturb her pelvic structures; especially should she do so about her menstrual period. In conclusion, I would suggest that rapid dilatation may be substituted for other means in nearly every case where dilatation is indicated.

## DISCUSSION.

Dr. Gordon, of Portland, Maine, opened the discussion upon the preceding papers, grouped topically, at the request of the Chairman:—

I hesitate very much on this occasion, in the presence of so many distinguished men, to open this discussion, but do so at the command of yourself.

I am, in general, fully in accord with the sentiments of the paper by Dr. Madden. I believe that the profession have, heretofore, regarded the uterus as the principal cause of the sterility. I think too much stress has been laid upon this point and too much operative interference has been resorted to, with much harm to the patient. In my own experience, I have found that but few cases of sterility depended upon stenosis of the os uteri or contraction of the cervical canal, and, consequently, dilatation has failed to accomplish much, while it is attended with much danger.

The first and a very important cause, I believe, is vaginismus-dyspareunia. Any cause of painful coition is an element in the prevention of impregnation.

Secondly, a barren soil must, necessarily, be barren as to fruit. There must be a healthy endometrium, and any displacements or deformities of the uterus are almost sure to produce a state of chronic passive congestion, causing thickening, neoplasms and anæmia of the membrane, each and all important elements in causing sterility. Until all displacements and deformities are corrected we cannot expect the function of the membrane to be properly performed. Our distinguished guest, Dr. Graily Hewitt, who sits at my right here, has done much to instruct the profession in this direction, and too much credit cannot be awarded him. Place the organ in its proper position, absolutely and relatively, and the membrane is rendered fertile, and no dilatation, incision or discission will be required. After this a cure of the curable troubles of the ovaries and fallopian tubes, and we have accomplished the most that our art and science can.

Dr. A. Martin, of Berlin, Germany—The opinion of the profession has undergone remarkable changes since the time of Sir James Simpson. We cannot but suppose that unlucky consequences have followed the use of tents, of whatsoever material, and have suggested the so-called rapid dilatation. But also in this method of procedure the development has been rather a limited one. Dr. Wathen's instrument seems to be well designed for the purpose, and Dr. Wathen is quite right to prevent, by the construction of the instrument, any slipping of the womb. The instrument allows an astonishing degree of dilatation.

As to my own experience, I have often felt to question: Is it necessary to dilate so often and to such an extent? We use dilatation in a much more limited way at present, particularly because dilatation does not give us knowledge sufficient for diagnosis in most of the cases of diseases of the *corpus uteri*. For these cases the curette is a much more useful instrument, for the use of which we do not require dilatation. I admit that there remain cases in which dilatation is unavoidable. For these, such instruments or similar ones may be used. I prefer, and recommend to those accustomed to operate, the slitting of the uterus so far as to pass the finger, and then sewing the divided parts at once, similarly to the operation of Emmet. This heals in quite a normal process, if sepsis has been strictly avoided. How to do so may be left out of the discussion. Incised wounds are more apt to heal than torn ones.

Dr. S. H. Weeks, of Portland, Maine—In the reading of the papers two points presented themselves to my mind. 1st. All cases of dysmenorrhœa are not due to mechanical obstruction of the cervix uteri. In my experience more cases have been due to abnormal conditions of ovaries and tubes. In such cases mechanical dilatation will do no good.

I have been surprised, in the reports of more than one hundred cases reported by Dr. Goodell, in the *Medical News*, that no bad results occurred. I am sure that while it is an instrument for good, it is also capable of doing much harm.

I lost a beautiful young lady after this operation, made the second time. She had suffered dysmenorrhœa several years, and urged that something should be done for her relief. I dilated with Dr. Goodell's dilator. She received some benefit, but in a few months the pain returned in all its severity. The operation was made the second time, with all the care which could be used. For four or five days everything went on satisfactorily, when acute peritonitis set in and my patient died, as the result of the operation.

Dr. C. R. Reed, Middleport, Ohio, referred to the opinions of Emmet and others who condemn dilatation under all circumstances as dangerous and unnecessary, while Goodell and others endorse it as safe and efficient. Emmet claims that hot water in the knee-chest position removes the condition for which dilatation is used; that dilatation, with proper precautions, is as safe as other surgical operations, and it cannot be predicted whether a dilatation will be safe or otherwise.

Dr. Graily Hewitt had listened with much interest to the two papers just read, one on cervical dilatation for dysmenorrhœa and one on sterility, both of which touched on subjects on which he felt tempted to offer one or two remarks. He would beg to thank Dr. Gordon for his complimentary and appreciative remarks concerning himself. In reply to the remarks of Dr. Reed, he had to say that he had no pretensions to compete with the late Dr. Hodge for his valuable discovery in regard to the treatment of retroversion and flexion by the well-known Hodge pessary. In fact, he himself had adopted the principle of Dr. Hodge in endeavoring to provide a pessary to prevent undue descent of the fundus anteriorly in cases requiring it, and in doing so by the "cradle" pessary had found the Hodge principle a valuable basis for that instrument. As regards the wide question embraced by the two papers, he thought one important point had not been touched upon in either of the two papers, viz.: the question as to the cause of the improvement afforded by dilatation. He was of opinion that the narrowing of the cervical canal was very frequently due to compression of the anterior against the posterior uterine wall, whereby the canal becomes virtually closed in certain cases of flexion of the organ. Now, in dilating the canal it seemed to be forgotten that the "canalization" of the uterus, as Dr. Matthews Duncan terms it, is not only a dilatation but a straightening of the canal, and as a result of forcible and wide dilatation, there would occur effusion of lymph in the uterine walls, followed by hardening and condensation, and the effect would be the same as if an anterior and a posterior splint were applied. In this way we would for a considerable time not only open the canal, but maintain it in a more straight condition than before. This is exceedingly important to bear in mind in estimating the value and applicability of dilatation as a method of treatment.

Dr. A. H. Goelet, of New York, said, in defence of rapid dilatation, that the term rapid dilatation is a misnomer, and is only given to the operation to distinguish it from the gradual dilatation by tents and bougies. It is never necessary to dilate to the extent of divulsion if a stem, properly perforated to allow drainage, be used after, to prevent recontraction.

I do not think Dr. Emmet's condemnation of the operation should be accepted when he has never done the operation—has never tested it. A full account of the operation as performed by me will be found in *Medical News*, April 15th, 1885.

Dr. I. W. Faison, of North Carolina—I arise to defend the operation. Have performed it twenty to fifty times a year for eight years. Never had any bad results at all. Our country air may have aided my patients in getting along so well. Never have used an antiseptic other than plenty of soap and clean water. Never have had

to repeat the operation on same patient but once; always used hot water as a vaginal injection night and morning after the operation.

Dr. A. Reeves Jackson, Chicago, Ill.—I wish to say just a word in regard to these large, powerful dilators, and that is in condemnation of them. I have an objection to the method of rapid dilation in addition to those which have been named, namely, that it does no good, except temporarily. Already two of the gentlemen have spoken of the need of repeating the operation—one the second time, and the other three times. Why? Because the previous ones were unsuccessful. Surely a dilatation to the extent of an inch and a quarter can never be necessary for dysmenorrhœa from insufficient size of the cervical canal. Nature has fixed the proper size of this passage. We cannot improve upon it. When such an instrument as we have been shown can be introduced into the canal with any safe degree of force, dilatation is wholly unnecessary.

Dr. A. P. Clarke, of Cambridge, Mass.—There is a long history to this operation of dilatation of the cervix. Opinions of authors are widely different, but there seems much to be gleaned by reviewing the question of dilatation. In cases of "pin-hole" os, in which there is constriction of the internal os, the operation is necessary. The cases in which the operation is most necessary are where there is great difficulty in introducing a small uterine probe. Such cases are usually attended with abnormal flexure of the canal, and dysmenorrhœa usually exists; in such cases it becomes necessary to introduce a small probe, so as to be able to insert a small uterine dilator. First ascertain the depth of the uterus; then introduce the small uterine dilator nearly to the fundus uteri, and dilate gently.

Dr. Balls-Headley, Melbourne, Australia, said: It seems to me that waves of practice occur. Years ago the uterine canal was divided by some form of metrotome, which usually acted irregularly and excessively and created laceration of the cervix —more evident still after division by scissors—and was found unsatisfactory. It was dilated by mechanical dilators or by tents, whether of sponge, sea-tangle, or other material—also found to be bad; and intra-uterine stems were generally discarded. Then by the knife; and now forcible, extensive and rapid disruption by powerful mechanical dilators is in vogue in America.

For myself, I practice nothing but gynæcology, and have for years elected, in cases of pure contraction of the inner os, to introduce Sims' speculum, hook the anterior lip, draw on it very slightly, to straighten the canal without dragging, pass a sound, so as to feel the stenosis and line of direction of the canal; introduce a Sims' knife and slightly divide the two sides, so as exactly, in the size of the canal, to imitate nature in her perfection, and pass a sound as the proof. A piece of lint one-third of an inch broad and two and one-fourth inches long, tied with a silk thread, squeezed out of a solution of a one-in-four persulphate of iron, is then introduced on an applicator to just beyond the inner os; a small pad of carbolized cotton supports it, and the patient goes to bed. On the following morning these are removed and nothing else done. After a week in bed the patency of the canal is tested and found free to the gentle passage of the sound. No intercourse is allowed till after the next menstrual period, when pregnancy often immediately occurs.

The rest is beneficial and the results are highly satisfactory; there is no bruising, and I think a slighter operation, taking but two or three minutes, can scarcely be performed. Any operation or injury of any part of the body must have a percentage of mortality, and while discarding all metrotomes and stems, and the creation of the lacerated cervix, I think the injury inflicted should be of the slightest and least

irritating kind, and am not at present disposed to exchange this mode for that now advised—yet it may be that the more extended experience of the practice in American hospitals, which I hope shortly to have, may convert me.

Dr. J. W. Hoff, of Ohio—I simply wish to enter my protest against too much and too rapid dilatation of the neck of the uterus, or, strictly speaking, of the internal os. I have uniformly accomplished all that could be done in such cases by gradual dilatation, followed immediately by the introduction of a soft tent made of cornstalk pith or slippery-elm bark, covered with absorbent cotton and well moistened with glycerine and carbolic acid, to disinfect, and then kept in place by a cotton tampon moistened with the same disinfectant. I prefer these tents to sponge tents, as they often, with every care, produce irritation and inflammation.

Dr. C. Henri Leonard, Detroit, Mich.—A point that seems to have been overlooked in the paper, and an important one, that needs to be considered when speaking of the advisability of this operation of extensive dilatation of the uterine opening, is the normal size and shape of the canal.

From quite extensive researches in this direction, made by taking plaster casts of uteri at our dissecting-room, I have demonstrated that the uterine cavity is formed, in a diagrammatic way, of three triangles. The larger one, with the base upward, corresponds to the cavity of the fundus. The two lower triangles, placed base to base, give us the cavity of the neck.

Now, from the study of nearly a thousand cases, I have found the normal diameter of the external os and internal os to be equivalent to number 11 of the French scale of sounds. I have also found the large diameter (about four times that of a small os) of the neck cavity to be about one-half inch upward, and the thickness of the narrowed portion of the cervix, from the os upward, to be less, on the average, than one-fourth of an inch. This being the case, I can see no anatomical reason for the extensive use of excessive and general dilation of the uterus, as advocated in this paper, and so extensively recommended by certain eminent Eastern gynæcologists. The anatomy of the parts certainly does not warrant it, to say nothing of the dangers imposed upon the woman. I am no stranger to the operation here proposed—for I have dilated the uterus frequently, upward of a hundred times—but since I have learned this anatomy of it, I do not dilate it once now where I did twenty times in years gone by; for I do not believe it is necessary. I have found other treatment less dangerous, and equally effective in curing the sterility and dysmenorrhœa. My successful cases of pregnancy following treatment is now about seventy-five per cent., about the same I used to get under the severer treatment. While I never lost a case from dilation, I have had several cases of severe inflammation, pelvic peritonitis, and cellulitis follow my manipulations; I do not have them now. I am also quite fully convinced that the majority of our cases of dysmenorrhœa are dependent upon congestive endometritis, thus producing, for the time, a narrowing of the uterine canal; this being cured by appropriate applications internally, as regards the uterus, or applied at the upper vault of the vagina, relieve the trouble. I am positive, from my experience, that astringents are absorbed by the blood vessels, and control intra-uterine congestions, even without their application to the cavity of the uterus proper. I have taken, in late years, quite a conservative stand in this matter of forcible uterine dilatations, and so teach my pupils that it is not prudent to employ them nearly so frequently as is recommended by some writers.

Dr. YOUNG H. BOND, of St. Louis, stated that he was surprised that no mention had been made of the use of the dilator in the correction of elongated cervix, with pin-hole opening. It was the custom to amputate the cervix in such cases, but experience in the use of the dilator had persuaded him that amputation was never necessary, and that a normal condition of the parts could be brought about by dilatation.

Dr. TRENHOLME, of Montreal, remarked that cases of tubal or ovarian disease contra-indicated the operation. Diseases of the tubes were readily detected shortly after menstruation by the enlarged condition of the organ. The use of the curved stem, worn for some time afterward, was necessary to obtain any permanent good.

Dr. LAWRENCE, of Bristol, England, had used sounds constantly for years. His patients are constantly coming back. In the unimpregnated uterus, with proper precautions, this treatment can be used, but the sound must not be left too long. He used gelatine-coated sponge tents, previously saturated with carbolic acid.

In addition, Dr. GOELET said he wished to say, in condemnation of division of the cervix, that it was unnecessary and objectionable because of the liability of cicatricial contraction to follow. Recently I dilated in the case of a lady who had had the posterior lip of the cervix cut by a distinguished physician of Washington. She was worse after the operation of division, and menstruated with great effort and pain. After dilation and the use of the stem (the laceration or incision of the previous operation being sewed up at the time) she was completely and permanently relieved. Cicatricial contraction had occurred after the first operation of division, and the mutilation was useless. It was permanently overcome by proper dilation.

Dr. WM. J. ASDALE, of Pittsburgh, Pa., speaking on the subject of rapid dilatation of the cervical canal, if done with steel instruments, in the treatment of sterility or dysmenorrhœa due to obstruction, said that in a somewhat extensive experience he had never had a fatal or even an unpleasant result to follow the procedure; had long since discarded sponge or tupelo tents for the steel dilator, in this use. He thought too great dilatation was often practiced, doing unnecessary violence to the parts. He did not ordinarily employ anæsthesia; thought anæsthetics needed only where dilatation was rapid, for exploration by the finger. We should not perform rapid dilatation (or any other) in the presence of an acute or subacute cellulitis; too much care cannot be exercised in this regard.

Dr. B. BURNS, Allegheny City, Pa.—In cases of mechanical obstruction at the internal neck, causing dysmenorrhœa and sterility, bilateral incision of obtruding angle, passing in of a modified Ellinger dilator, slight dilatation and introduction of divergent hard-rubber stem pessary, with daily irrigations of bichloride sol, 1-3000, have given me best results.

Dr. DANIEL T. NELSON, of Chicago, said:—Dr. Gordon and others have spoken of the congestion of the uterus producing sterility, the mucous membrane not being a good soil for the planting of the impregnated ovum.

I would enlarge this thought, and say that the *whole genital system* must be in a healthy condition—vagina, uterus, tubes and ovaries—with no gonorrhœal or other poison lurking in any part.

If the mucous membrane is to nourish the ovum, as taught by Prof. Ercolani, during the first weeks of gestation, there must be no abnormal congestion, neither can there be a deficient blood supply, an infantile uterus, a cicatricial condition of

mucous membrane or other structures of the uterus, the result of gonorrhœal or other forms of inflammation.

It is important also to examine carefully the other side of the house, to make sure that *his* organs and their secretions are in a normal condition—free from gonorrhœal or syphilitic virus and able to secrete normal, active spermatozoa.

The advantage of sea-bathing for sterility I fully appreciate, but explain it in another way; that the husband being absent, the genital organs of both husband and wife have, or ought to have, a period of rest, and so are allowed to recuperate, for there are not a few cases of sexual *indigestion* the result of work, which rest will cure.

The same causes which operate so effectually in the prostitute to prevent conception, produce sterility in the legally married with equal certainty and in the same way.

For the best fertility there must be the best health in all the tissues of both the sexes.

Dr. N. LAPTHORN SMITH, of Montreal, said there was one cause of sterility which had not been referred to; it had been referred to by Professor Pajot, of Paris, and Dr. Matthews Duncan, of London. It did not depend on stenosis; it did not depend on a diseased mucous membrane, nor on the ovaries nor tubes. It depended on the testicles. I was reminded forcibly of this fact some years ago, when, after having had a number of successful cases of impregnation, I came across a failure. On examining the semen of the husband, not a single spermatozoid could be found. Had I not made this examination, I would have, perhaps, been working at her yet.

Dr. WATHEN, in closing the discussion said: I am pleased to recognize Dr. Emmet as authority on many subjects in gynæcology, but I am surprised that he should be quoted as authority upon rapid dilatation of the cervix, as he seldom, probably never, performs the operation, and positively refuses to recognize an obstructive form of dysmenorrhœa. To be logical, he cannot perform the operation, and can have only a theoretical knowledge of its value; hence the relative insignificance of his opinion, compared with the opinions of gynæcologists of large experience in this operation.

Rapid dilatation is also a valuable means of removing obstruction due to flexure of the neck, if, after the first dilatation, we reverse the concavity of the blades, and expand the instrument a second time, following the dilatation with an intra-uterine stem, to be worn until the local effects of the operation have mainly subsided. Dilatation may also be indicated in some cases where there is no permanent congenital or acquired pathological narrowing of the canal, but the woman has spasmodic contraction resulting from a so-called fissure at the utero-cervical juncture, similar to fissure of the rectum, and the operation cures the trouble, just as divulsion of the anus cures anal fissures. We can arrive at a reliable conclusion as to the relative dangers in enlarging the canal with tents, incisions and rapid dilatation, only by observing the experience of those operators who have carefully tested all these means; and the opinion of such men is universally in favor of the latter method. Having carefully given the indications and contra-indications for the operation, it is not necessary to repeat them, but I regret that the discussion should have assumed a latitude not contemplated in the paper, including, as it has, the operation for the removal of conditions that could not be expected, by any logical process of reasoning, to be benefited by the dilatation.

Dr. A. Y. P. GARNETT read for the author, Dr. HORATIO R. BIGELOW, a paper entitled—

# CONSERVATIVE GYNÆCOLOGY.

## GYNÉCOLOGIE CONSERVATIVE.

## CONSERVATIVE GYNÄKOLOGIE.

1. *Plan and Purpose.*—It seems wise to me to place before this representative body of the world's intelligence in the special department of medicine and surgery by general acceptance known as Gynæcology, the summing up of that which lies scattered through the pages of medical literature, and more especially to gather into one harmonious, coherent whole the "fliegenden Blätter" of my own production. During the last three years I have given much attention to this subject, and I have not scrupled to give my views as general diffusion as possible. It is not strange, then, that my name has become indissolubly linked with this "hobby"—if so you shall see fit to classify it—and, parenthetically, I would express my willingness to accept the word, provided I ride the "hobby" gracefully, and keep my seat in all scientific encounters. The history of medicine is a recapitulation of individual vacillation, of selfish egoism, and of unstable doctrines. The grand discoveries mark with red letters certain eras separated by years of time, and are connected rather with medicine as an exact science than with medicine as a practical study. The theories of yesterday are the superstitions of to-morrow, and the practices based upon such theories become the shuttlecock of each doctor's battledore. One man who is handy with the bat may keep the feathered fancy flying about through his generation, but his children bury these things, or cherish them as curious antiquities, or as exemplars of the strange vagaries which sometimes govern communities. Ambition often defeats its own aims by excessive zeal, and by the abuse of a useful procedure brings opprobium upon such practices. Then another era is born, and with it old forms pass away, and the new birth, which is the aggregate of the intelligence of preceding generations, finds out that certain discarded elements are inherently potential for good when employed with discrimination. So, medicine revolves in cycles, bringing old forms from out the dust of antiquity, and then relegating them to their oblivion to make way for new conceits, which, in their turn, also will join the endless throng. The papyrus of Ebers tell us of surgeons who were in the habit of making iridectomies in the time of Rameses II. Then the custom, through its abuse perhaps, fell into desuetude, to be revivified in these days of modern enlightenment. The history of bleeding, as a curative measure, is a curious exposition of the need of an exact and scientific therapy. It was known and practiced by the ancients, and ever since this time it has been undergoing the pangs of difficult labor. This vacillation, and lack of coherence, is due to an entire absence of a definite and exact scientific logic of medicine. A new discovery in medical therapeutics is wont to become the ruling fashion, and so destroys whatever of actual merit it may possess by abuse and misuse.

A new surgical venture, meritorious in itself, and of permanent value in the hands of men qualified to adopt it, becomes almost criminal when it assumes a fashionable garb. The history of mankind is dotted all over with strange disturbances, both psychic and physico-religious frenzies, dancing manias, magnetic enthusiasts, spiritualistic delusions, alchemic dreams, and the like. As a chapter in this history, we find the same perversions running all through the growth of medicine up to this year of grace, when the fashionable gynæcological craze is abdominal surgery. It is very far from my intention to travesty so grand a department of the healing art. Measured by its results in the hands of intelligence, it is the glory of modern surgery; but as a fashion-

able craze, carried into effect without exact diagnosis, and before the merits of a more conservative plan have been tried, practiced by every ambitious doctor who desires to report a case, it becomes a dangerous procedure, if not absolutely criminal. I have been present, either as assistant or as invited guest, at a vast number of laparotomies, gastro-hysterectomies, and so forth, and all that I have previously written, and that which I write now, is deduced from actual observation and from much patient weighing of evidence. So, a part of the purpose of this paper is to show that certain enthusiasms have marked each era in the history of medicine, which are apt to become pernicious in proportion as they assume overruling predominance, and that abdominal surgery may fall under the ban, unless it be restricted to its proper limits and to men competent to practice it. A second purpose is to urge upon the profession the claims of "Conservative Gynæcology."

2. *Conservation of Energy in its Relation to Conservative Medicine.*—Surgery becomes conservative when it tends to alleviate suffering without resorting to operative interference. Since the integrity of bodily function depends upon the harmonious action of each component member, and since each member contributes its substance to further a just equilibrium, it follows that the abstraction of any factor will disturb the balance, just as a member diseased will disturb the whole economy. The conservation and correlation of physical forces is well recognized by savants; and as human life, in all that is finite, is merely a form of matter in motion, it may possibly be correlated with some of the occult forces about it, whose functions and nature we know but slightly. Conservative medicine tends to the conservation of human energy. Normal human energy is the actual outcome of the *mens sana in corpore sano*, and cannot be perfectly manifested under untoward circumstances. Some extraordinary examples are of record, made the more salient because of their rarity, in which great energy has been projected in weakened and crippled bodies; but this is always obtained at the expense of some other function which becomes proportionately weakened. The chemico-molecular changes that engender nervous action undergo serious and lasting disturbances from shock, or grave impressions stamped upon them, and the integrity of the energy which normally is thrown out becomes altered in proportion to the nature of the shock received. It is an essential condition of health that the physiological conditions governing bodily injury should be maintained in so far as it is possible. To this end scientific medicine should bend its every and best endeavor that this energy may never be weakened or recklessly expended, but the rather that it may be stored up to manifest itself later in some form of force. To deprive the human frame of any part of its component elements, no matter how small the element may be, not only robs it of a portion of some form of force, but disturbs as well the harmonious interblending of the forces originated by all of the other elements. An element weakened by disease works viciously, it is true, or, perhaps, not at all; but if we seek to restore it to normal we should not eliminate it altogether, but endeavor to heal the trouble, and thus restore the element to at least a measure of healthy action.

3. *What is Meant by "Conservative Gynæcology?"*—From what has gone before, it will justly be inferred that I mean by "Conservative Gynæcology" any plan that tends to preserve the just equilibrium of human energy, so far as this specialty is concerned, before resorting to means for the elimination of the offending organ—any plan that offers reasonable assurance of alleviation from suffering, with a prospect of a measurable enjoyment of life, coupled with the ability to engage in moderate social requirements, with all the female organs intact, and without involving a risk of life. This is Conservative Gynæcology as opposed to Surgical Gynæcology. He who has watched the tendency of modern specialism during a decade of years gone by, or who has allowed himself to drift adown the stream that is full of the snags of frightful mortality, and muddy with the embryonic struggles of feeble pathology, will realize the

importance of the issue. However great the shock to our personal vanity, the interests of humanity demand that we must realize the utter impossibility for us all to be Taits or Schröders, or Emmets and Keiths, or Peans and Slavjanskys. The value of any surgical measure is approximated by the aggregate of *all* results. If youthful ambition shall consider itself as competent to perform an abdominal section as any of these gentlemen whose names are the stars of modern surgery, pure, wholesome surgery must inevitably be brought into disrepute. Every man—I mean a large majority of the men who do successful laparotomies—rushes at once to the "Journal" with an elaborate account of the operation. The same eager enthusiasm is not a marked characteristic if the result should happen to be unfavorable, and hence it becomes a longed-for goal of youthful aspirants, nay, even of older men, to have it recognized that John Smith has done five abdominal sections. What are the results? In nine cases out of ten the selfish end has been gained by the sacrifice of seventy-five per cent. of the women operated upon. Surgery is an enticing art—brilliant, and covering with fame the men who have done the most to make it so brilliant. It has a dangerous seduction, and unless the tide soon turns in the other direction, it will handicap itself with false disciples and shocking results. The work that John Homans has done in America is not merely the result of years of study and experience, but is the outcome of a special surgical type of man, and this may be said of Tait, of Keith, of Bantock, of Thornton, of Schröder, of Martin, of Sänger, of Leopold, and others. *Poeta nascitur non fit* will apply as well to the surgeon as to the poet. It requires something more than a mastery of anatomy to operate well, and for those who have not the peculiar gifts and characteristics that form an essential part in the make-up of the surgeon, there remains a field equally as large, and in which the results will be quite as brilliant. Somebody must do the work. The great body of gynæcologists are more competent to its successful accomplishment than they are to deal with abdominal sections; and he who battles with pain, conquers it, and carries the woman through life with all her organs intact, is quite as worthy of praise as the great surgeon who brilliantly removes the offending factor.

4. *General Medicine in its Relation to Specialism.*—I hold it to be axiomatic that no man can be a good specialist who is not conversant with general medicine—not merely clinical medicine, but the science and art of medicine as correlated with physiology and pathology. Because a woman suffers with her pelvic organs, we are not to suppose that other parts of her economy may not be deranged, from causes in nowise connected with the pelvic disturbance. Especially should he be familiar with the whole nervous apparatus, in conditions of health and disease. Restricted to its narrow limits, there are few medicines demanded for the treatment of gynæcological diseases pure and simple, but since the constitutional element is a factor necessarily involved in a consideration of the treatment of any rebellious concomitant part, we should be fully alive to questions of vascular irregularities, stomachic, cardiac, and hepatic troubles, and to the relaxing tendencies of certain diatheses. I fully believe that many female complaints which are primarily treated as gynæcological, and not always with signal success, would fare much better if the constitutional indications were first studied, for it not infrequently happens that the local manifestation is a mere symptom. Specialism should not be exclusive or narrow-minded, but expansive and liberal. The specialist should not only be able in general practice, but preëminent in his specialty. If we look at women as simply collections of pelvic aches and pains, or if we believe that a woman can *only* ache in her pelvis, and nowhere else, we are not worthy of a seat in this Section.

5. *The Tendency to Operative Measures a Dangerous One.*—I need not dwell long upon this subdivision. I have already considered it, and that the tendency is a dangerous one few of us will deny. Who can begin to enumerate the number of cases in which the

abdomen has been opened for supposed ovarian disease, when not a trace of anything pathological was discoverable? Who will write the history of the cases in which perfectly healthy ovaries have been removed, as an offending cause, without one shadow of improvement in the general condition of the patient? A human life mutilated, deprived of its distinctive characteristics, and rendered miserable! A human life poised between earth and heaven to gratify the bad diagnosis, faulty pathology, or personal conceit of an irresponsible practitioner! A human life sacrificed *to ambition upon the operating table!* Do you wonder, can you wonder, in the face of the grinning, horrid, damning facts, some of which are of record, and a host of which hide their ghastliness in dark places, that there should go out throughout the land a cry for conservatism? Can you, even in the halo of your own success as an abdominal surgeon—a success which is deserved, and which the world recognizes—can you for one instant look through statistics as a *whole* and not bewail the growing tendency to cut a woman up?

6. *Conservatism Applied to the Treatment of Uterine Tumors.*—In the twenty minutes allowed me it would be quite impossible to give a *résumé* of what has been published in this direction. I must presuppose that the literature is known to you. In a remarkable paper read before the Chicago Gynæcological Society, May 28th, 1886, and reported in the *American Journal of Obstetrics* for September, 1886, Dr. Charles T. Parkes reports four cases of uterine fibroids treated by the internal administration of ergot. "They all resulted in recovery by expulsion of the growth." The closing words of Dr. Parkes are as follows: "I am quite well aware that four cases cannot be considered absolutely demonstrative of any rule, still these four increase the number already published in proof of the curative action of ergot, administered thoroughly, for submucous uterine growths. It is impossible for me to understand how some good authorities can still assert their disbelief in ergot; in fact, calling it the most inert and disappointing of all drugs. No possible argument can disabuse my mind of the belief that its action was positive and certain in the cases related. No law has as yet been evolved fixing, even by approximation, the period of time required for the effects of the medicine to show themselves. The idiosyncrasies of the patient, the thickness of the uterine envelope, the distance from the mucous membrane, the purity of the drug, and many other conditions, render it scarcely possible that any such law can ever be laid down. The trial should be made patiently and persistently, just so long as the patient's condition will warrant its continuance, and a complete expulsion of the growth, followed by rapid recovery, will be the reward." In the discussion of this paper Dr. Henry T. Byford said: "There is no longer any reason to doubt that ergot is the surest and safest cure for all but the very exceptional cases of uterine fibro-myomata." Dr. F. E. Waxham added his testimony to the value of ergot in the treatment of submucous fibroids. In closing the discussion, Dr. William H. Byford said that he knew personally of twenty-six cases of the expulsion of the tumor in this way. Of the twenty medical men whom I find in medical journals as reporting cases treated by ergot, there were only three who failed to derive any definite result from its use. As to its action in *all* cases of uterine myoma Dr. William H. Byford says: "I have been often asked the question, Can ergot affect the subperitoneal tumors? I think they are frequently starved out and cured; when not too near the peritoneum there is no danger of their becoming detached and putrid in the peritoneal cavity, because the action is from the tumor." Dr. Byford also said that ergot would not affect tumors that were submucous, or those with extensive adhesion to the walls of the abdomen. Of Cutter's diet treatment and elastic pressure we need more extensive experience and testimony. Apostoli has done good work with electricity, and Mundé (*American Journal of Obstetrics*, September, 1886), writing upon his visit to Europe, says: "I am confident that the galvanic current, used at as high an intensity as the patient can bear, we have

most powerful agent for not only controlling the growth, but also the symptoms, chiefly hemorrhage, of fibroid tumors of the uterus of all sizes and locations—an agent which I would strongly recommend to our specialists for thorough trial before hastily resorting to oöphorectomy and hysterectomy." He also reports a case of his own successfully treated in this way. Apostoli has carried the current up as high as 200 milliampères, and Mundé saw and examined twelve women at Apostoli's clinic who were undergoing treatment in this way. Personally I can report only one case treated with the galvanic current, but in this, a large hard fibroid (subperitoneal), the result was most gratifying. I should like to go into the subject more extensively, but time will not permit. Thomas Keith wrote to Dr. Mundé: "Look at it as you may, hysterectomy is a very risky operation, and the natural history mortality of fibrous tumors is practically *nil*. I have worked among them for the last thirty years, and that is my experience."—*American Journal of Obstetrics*, September, 1886.

It is quite exceptional, so far as my experience and observation are worth quoting, to find a tumor that actually endangers life. I have seen many hundreds of tumors, but the history of hemorrhage—dangerous hemorrhage—was rare, and I have only seen five uterine myoma which endangered life by reason of pressure. I have been present at over two hundred and thirty laparotomies for uterine tumors; but I am sure the operation, as an *absolute* necessity, was indicated in a small percentage of cases only. Most of these cases would have done well under electricity, and all of the submucous ones might have been treated with ergot without risk to life. Until conservative measures are exhausted, I do not believe that we have any right to endanger the patient's life by operative procedure. Here, of course, will come in the question of the advisability of early operations. It may be predicated, first, that any abdominal section carries with it a certain risk of life; second, no man can foretell the growth history of any tumor; third, only exceptionally do uterine myoma endanger life. In this class of adventitious growths I am strongly opposed to early operations, or, indeed, to any operation whatsoever, unless as a last resort to save life. My general conclusions in regard to this subdivision are:—

1. Many remarkable cures of submucous fibroids by the internal administration of ergot are of record, and hence the measure commends itself to gynæcologists.
2. The results from the employment of the galvanic current in *all* forms of uterine myoma are especially gratifying, and in electricity we have a most powerful remedial agent.
3. The constitutional, dietetic, and hygienic measures should be intelligently directed: these consist of tonics, aperients, good nitrogenous food, warm clothing, cleanliness, and fresh air.
4. Cutter's treatment should be tested further.
5. Early operations, in the case of uterine myoma, can only exceptionally be called for.
6. Dangerous hemorrhages are not the rule.
7. The percentage of tumors endangering life by pressure is small.
8. An operation should never be undertaken until the means above mentioned have been tested thoroughly.
9. Hysterectomies, myomotomies, and oöphorectomies are always attended with risk of life, and the danger should be pointed out fully to the patient beforehand.

We must now pass on to a consideration of subdivision

7. *Conservatism Applied to Tubal Disease and Inflammation of the Ovary.*—Through the medium of different medical journals I have upon several occasions endeavored to make clear my views upon this subject, citing cases in point which were under my immediate supervision. There are cases of pyo-salpinx, hæmato-salpinx and ovaritis, that will always demand the attention of the experienced surgeon, but it is entirely

incorrect to assert that *all* such cases call for an operation. I could cite one instance, the details of which were published nearly four years ago, in which a perimetritis and retroversion complicated a moderate degree of salpingitis, in which there were the monthly pains of subacute peritonitis, painful locomotion and an icteric discoloration, due, perhaps, to a spasmodic action of the gall-duct, which was treated entirely upon conservative principles, and with a very large degree of success. Pessaries were thrown away, because, with the tenderness around the utero-sacral ligaments, they could not be tolerated, and glycerine tampons of cotton were substituted. Turkish baths were ordered to make the skin more active. Rest treatment for eight weeks was carried out by Dr. Goodell in all of its details. Electricity was administered daily, with massage and Swedish movements. Later, cold bathing with vigorous rubbing was ordered, and this has been kept up ever since. The bowels are regulated by proper food and by deep massage over the course of the colon. Counter-irritation by iodine is sometimes applied over the ovary. Great attention is paid to the building up of the system by highly nourishing food at stated intervals. A few slight adhesions have given way to massage through the vagina. The patient now complains merely of some tenderness around the utero-sacral ligaments, which, singularly, becomes more pronounced at those mid-monthly periods in which, formerly, the abdominal pains were wont to manifest themselves so formidably. In other respects she is as well as most women. This case was seen by six different physicians of eminence, all of whom advised an operation. Dr. Goodell and myself always believed that it could be treated on the conservative plan, and the end has justified the opinion. I am very glad to have the opportunity of offering my tribute to this *'a vaχ 'aιθρῶγ*—this singularly able gynæcologist, accomplished scholar and Christian gentleman; for I owe to Dr. Goodell much of whatever I may accomplish in this specialty, and indirectly it was he who first stimulated me in my studies upon conservatism. The only objection to such a course of treatment is: first, that it is expensive; second, it requires a long time and a great degree of patience to accomplish anything like a satisfactory result; third, the psychic and subjective condition of the patient must be watched and handled as carefully as her physical and objective symptoms. A private hospital and skilled nurses, a good and competent massage assistant are essentials. But that many of these cases go on to a good recovery by patient, observant conservatism, I know, from my own experience, to be an accomplished fact. There are some points in the pathology of pyosalpinx which I confess I do not understand. Latent gonorrhœa in the male is, I take it, an accepted cause of most of these cases. Now, there is sent out during coition a germ, a gonococcus, that is capable of setting up degenerative changes in the tube. The product of this degeneration escapes into the abdominal cavity, giving rise to the subacute pains simulating peritonitis. Often this condition has existed a long time before the surgeon is called in. I cannot understand why the peritoneum and the lymphatic system should not become so thoroughly changed by the monthly, perhaps daily, contamination of these gonococci as to render an operation futile. If the tubes suffer so seriously, why should not other parts of the body, equally as sensitive, and in direct relation to the tubes, suffer to the same extent? Do the germs die upon reaching the cavity of the abdomen? How long does the escaped pus retain its activity in the peritoneal cavity? How long a time would it require to render the peritoneum and the lymphatic system so poisoned by contact with the germs as to make tubal extirpation of no use? I would also like to ask why it may not be possible, in some of these cases which dribble into the vagina, to catheterize the tube, as suggested by Dr. Kelly, and thus give free exit to the irritating fluid? It is not improbable that in the near future means will be found to reach the disease by medicines and local treatment. I am quite one with Dr. Coe in believing that vastly many more uterine appendages are removed than pathological changes require. Both Drs. Goodell and Baer could, I am

sure, furnish many cases from their records in which this plan of conservatism had been followed by results the most gratifying.

8. *The Relation of Gynæcology to the General Environment of the Patient.*—I can only give passing notice to an interesting class of cases that are well known to every gynæcologist. I mean those of run-down women, who consult us for some uterine disorder. In these women, I am quite sure that it is not the dislocated uterus which is to blame, but the every-day social demands, trials and environment, that must be studied. Immediate special interference is rarely accompanied with benefit; indeed, the nervous symptoms are often exaggerated by the shock to the modesty of a sensitive women which an examination entails. It is clearly our duty here, first, to win the woman's confidence, then so to adjust her daily life that she may be free from psychic disturbances and from physical drains. The rest treatment is here of superlative importance. No one, except she who may have profited from it, knows the blessedness of absolute bodily and mental rest, and few medical men who have not themselves witnessed the results will believe that it is possible to secure such euthanasia. Muscular tire often makes brain tire, and muscular rest and inactivity will often lull into tranquillity the most active brain. Little by little, as the woman begins to realize that with the morrow's awakening there will not be the endless round of drudgery, the exacting demands of a household, or the many, many trials and worries which fall to the lot of some of our patients, she will cheerfully resign herself to the sweetness of being cared for instead of caring for others. She will cease even to think nervously of the duties she has separated herself from, and will appreciate from day to day the improvement that she is making. Time enough to take the uterus in hand later; but it sometimes happens that we will have no occasion to interfere locally. The offending organ has profited from the example set by the rest of the body. I have never been more impressed with the value of general treatment in gynæcology than in the patients who were treated in this way. From an almost bigoted adherence to the doctrine that the constitutional disturbances were subsidiary to pelvic derangement, I grew to an appreciation of their significance as primary agents. It is true that amputation of the cervix will cure in fourteen days many cases of metritis, but it is equally true that electricity and general surveillance over the daily life of the woman will accomplish the result just as surely, and without any mutilation or risk of unpleasant sequelæ. It is also true that the surgical measure is not always effective, and its *modus operandi* is as yet questionable.

9. *Oöphorectomy for Epilepsy and Kindred Disturbances.*—I can scarcely believe that any surgeon would propose this measure for an essential epilepsy, uncomplicated with evident ovarian irritation. The argument, I take it, of the followers of Hegar is, that the peripheral irritation of the ovary is the starting point. Of course, it would be illogical to castrate a woman for a disease of the gray matter of the brain. It would be quite as rational to castrate a man for epilepsy, and yet I do not know of any recorded cases of this kind. If these inferences be conceded, who will define the ovarian conditions justifying radical means? Who can predicate a successful result, either from physiological deductions or from the limited statistics at hand? Who so profoundly a diagnostician that he will locate the primary cause? Epilepsy being a *discharging* lesion of the nervous system, with its location cerebral, it is not within the possibility of finite reasoning to predict the extent to which the sensitive gray matter is involved, nor the amount of damage already inflicted, so that, even if the epilepsy be extrinsic and peripheral in its origin, the extirpation of the ovary will only be sufficient to prevent further irritation, it will in nowise repair the mischief already done. It would be fatal to honest surgery to deduce anything but an argument purely tentative from the few successful cases reported, because we know little or nothing of the reflex neuroses connected with this specialty. Profound counter-shocks, which set up a different series of molecular changes, whose nature is unknown, often serve to arrest discharging

mucous lesions, and it is not impossible that the impression so originated is the explanation of these successes. Hegar himself would not advocate oöphorectomy in *every* case of epilepsy; but how discriminate? It would also be an unsound argument to say that, since we have no means of curing epilepsy in every patient, therefore, conservative treatment, as applied to women, would only be a waste of time. Every day that adds itself to the life of the ovary is important for better or for worse, and science is not yet in a position to assert whether this delay is wise or unwise. If there be epilepsies which are purely due to ovarian peripheral irritation, there must be something in the nature of the cause which we do not at all understand. One would suppose that cystic disease of the ovary would set up such necessary excitement, and yet it rarely if ever does so.

The operation for the relief of dysmenorrhœa is very questionable; for, in the first place, we are not sure that menstruation will be arrested, and, when so arrested, the pain persists with as much severity as formerly. (See *American Journal of Obstetrics*, December, 1886. Obstetrical Society, New York, "Persistent Menstruation after Double Ovariotomy.") A more complete discussion of this subject than I have time to give it will be found in *The International Journal of Medical Sciences*, for October, 1886. A remarkable discrepancy of opinion existed in the opinions sent to Dr. Battey by the leading gynæcologists. Some thought the operation indicated in suitable cases, but they fail to tell us the symptomatology and characteristics of these cases. Dr. Thomas thought it justifiable when the disease of the ovary could be made out clearly, and in this he shows clear-headed conservatism. On the whole, and in the present unsatisfactory condition of the whole matter, I would prefer to accept the conclusions of Sir Spencer Wells and of Dr. Emmet: "The sphere of active duty is wide, sufficing, ennobling to all who strenuously work in it. In the very sweat of labor there is stimulus which gives energy to life, and a consciousness that our labor tends in some way to the lasting benefit of others makes the rolling years endurable. . . . The toiling soul, after trying in various directions of *individual* effort and *individual* gratification, and finding therein no peace, is finally conducted to the recognition of the vital truth that man lives for man, and that only in so far as he is working for humanity can his efforts bring permanent happiness." (Lewes' "Life of Goethe.") All through his writings Lewes has a happy way of fitting into the empty places, and of expressing in captivating sentences the needs and unsatisfied longings that we all experience, but are unable to give utterance to. In the present chaotic condition of reflex neuroses, I hold the operation of oöphorectomy in the treatment of neuroses to be illogical and unsound, and it seems to be our plain duty, as honest surgeons and humanitarians, to raise our voices against this terrible onslaught. The relation of the ovary to such disorders is only a casual one at best; the *fons et origo* is central, and to mutilate a woman as a matter of experiment is criminal practice. In his address before the Philosophical Society, Washington, December 4th, 1886, Dr. Billings said: "'Four men,' says the Talmud, 'entered Paradise. One beheld and died; one beheld and lost his senses; one destroyed the young plants; one only entered in peace and came out in peace.' Many are the mystic and cabalistic interpretations which have been given of this saying; and if for 'Paradise' we read the 'World of Knowledge,' each of you can no doubt best interpret the parable for himself. Speaking to a body of scientific men, each of whom has also certain unscientific beliefs, desires, hopes, and longings, I will only say, 'Be strong and of good courage.' As scientific men let us try to be useful; and, in each capacity, let us do the work that comes to us honestly and thoroughly, and fear not the unknown future." And again he says: "This procession, bearing its lights of all kinds—smoky torches, clear-burning lamps, farthing rushlights, and sputtering brimstone matches—passes through the few centuries of which we have a record, illuminating an area which varies, but which has been grow-

ing steadily larger. The individual members of the procession come from and pass into shadow and darkness, but the light of the stream remains. Yet it does not seem so much darkness, an infinite night, whence we come and whither we go, as a fog, which, at a little distance, obscures or hides all things, but which, nevertheless, gives the impression that there is light beyond and above it. In this fog we are living and groping, stumbling down blind alleys, only to find that there is no thoroughfare, getting lost, and circling about on our own tracks as on a vast prairie; but slowly and irregularly we do seem to be getting on, and to be establishing some points in the survey of the continent of our own ignorance.

Frederick von Schlegel, in writing of the distinctive parts of ontology ("Philosophie des Lebens"), says: "The distinctive characteristic of nature is sleep, or the struggle between life and death; the distinctive characteristic of man is imagination (for reason is a mere negative faculty); the distinctive characteristic of the intelligences superior to man is restless, eternal activity, implanted in the very constitution of their being; and the distinctive characteristic of the Deity, in relation to his creatures, is infinite condescension." As the finite evolution of an infinite potentiality, we are impressed with a measure of the ceaseless activity of the "intelligences." May we so temper it with a realizing sense of our own weakness in the face of the "great continent of our own ignorance," that no personal ambition will weigh in the balance of a controlling appreciation of individual responsibility. In this very sense of responsibility we find the strongest proof almost of immortality, and it is only the "infinite condescension" that will blot out our many lapses from an observance of its dictates.

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Dr. S. H. Weeks, Portland, Maine, next read a paper on—

## PREGNANCY COMPLICATED WITH UTERINE FIBROIDS.

### GROSSESSE COMPLIQUÉE DE FIBROIDES UTÉRINES.

### SCHWANGERSCHAFT DURCH UTERUSFIBROIDE COMPLICIRT.

Mr. President and Gentlemen:—Believing that the treatment of pregnancy complicated with uterine fibroids is not yet definitely settled, I have ventured to bring this subject before the Gynæcological Section, hoping that it will receive the careful consideration which its importance demands.

I shall introduce the subject with a report of the following case:—

In February, 1886, I was called in consultation to see Mrs. ——, who was suffering from a large uterine tumor. She was about thirty-five years of age, robust, and presented the appearance of perfect health. She had one child, fourteen years of age; since the birth of this son she had never been pregnant. Her menstruation had been regular up to within two months of the time of the consultation, when it suddenly ceased, without any known cause. On examination, a large uterine fibroid was found occupying the posterior wall of the uterus, and so large as to block up the superior strait of the pelvis and extending up as high as the umbilicus. Since the cessation of her menses, she and her husband had noticed a rapid enlargement of the abdomen. Inasmuch

as she had been regular in her menstruation, and two months previously had suddenly ceased, after which the tumor had grown rapidly, I suggested to the attending physician the possibility of her being pregnant.

Under the circumstances it was deemed best to wait, and we asked the husband to bring his wife to us again in about two months. In the meantime the attending physician left the city for a European trip. At the expiration of eight or ten weeks, the patient came to my office for another examination. At this time I found the abdomen much enlarged, the fibroid occupying and almost completely filling the pelvic cavity, and also extending into the abdominal cavity. The uterus was in front, and so drawn up as to render it very difficult to reach the os. By placing the woman in the knee-chest position, the os could just be reached by passing the finger well up above the pubic arch. At this time, about four months or four months and a half since her last menstruation, I was confident that I heard the beating of the fœtal heart, and actually felt the motions of the child.

I was certain she was pregnant, and the important question presented itself, what shall we do? Shall we induce abortion, and attempt the delivery of the child *per via naturales*, or shall we allow gestation to go on to full term, and then deliver, if found necessary, by abdominal section? The uterine fibroid so nearly filled the pelvic cavity that only two fingers could be passed up between the anterior part of the tumor and the pubic arch. The space was so small that it seemed to me impossible to deliver the fœtus by the natural passage, even at this stage of gestation. After giving the case most careful consideration, it seemed to me that her chances of life would be better to allow pregnancy to go on to full term, and then as soon as labor pains came on, without waiting until her strength should be exhausted by the pains of labor, to deliver the child at once by abdominal section. I stated this opinion plainly and emphatically to the patient and her husband, in the presence of the family physician. Their physician was of the opinion that it would be better to induce abortion, to which opinion the patient was strongly inclined, although perfectly willing to have done that which seemed best.

The case presented such grave importance that I asked the husband to take his wife to Boston and consult a distinguished gynæcologist there, and after getting his opinion, to go to New York and consult the two leading operators of that city. I promised to yield my opinion, if they advised immediate delivery.

He did as I requested, and in Boston received precisely the same advice which I had given him, to wait and allow gestation to go on to full term. He then went to New York to consult the two men whom I mentioned. One of them had gone to Europe; the other he consulted, and received his written opinion. The following is a true copy:—

"1. She is pregnant, about five and a half months, and has a fibrous tumor blocking up the outlet of the pelvis at the superior strait.

"2. If the pregnancy is allowed to proceed, laparatomy will become inevitable.

"3. If premature labor is promptly induced, the dismembered fœtus may be withdrawn *per via naturales*.

"4. If such withdrawal fail in its accomplishment, removal of the fœtus by laparotomy would still be feasible.

"5. In view of these facts, I would advise, as the best course, the immediate induction of premature labor.

"6. The method of producing this process in this particular case is important, because it is so difficult to reach the os uteri.

"I would place the patient in the knee-chest position, pass the long nozzle of a Davidson's syringe (bent) up to the os internum, and, for ten minutes, inject hot water. This I would repeat in two hours, and continue to do so until the os was dilated and labor established; then, under ether, I would deliver. Should delivery fail of accomplishment, but one resource would remain—laparotomy.

"7. I would not favor delay to full term; for the rights of the mother, in my judgment, are far above those of the child."

To this opinion two of Boston's gynæcologists assented—one verbally, and the other in a written statement. When he returned to me with the statements of the men whom I had asked him to consult, I had but one course to pursue, viz.: to yield my opinion, as I had promised to do.

He placed his wife under my care, and I as loyally carried out the plan as if it had been my own originally. After a few days of preparatory treatment, the hot-water injections were used as suggested. After repeating them four times, the labor pains were strong and comparatively regular.

In twenty-four hours from the time of commencing the hot-water injections, the os being fairly well dilated, the patient was etherized and placed on her back, on an operating-table, and brought well down to the end of the table.

I passed my hand, well oiled, into the vagina, and gradually and carefully passed it through the narrow space between the tumor and the pubic bone, and reached the os, which was found dilated to the extent of a silver dollar. Two fingers were passed into the os, and then three fingers, and last, my whole hand was passed into the uterus and brought in contact with the child. The head was the first thing I felt. I soon found the feet, which I grasped and brought down, and soon the body was delivered, but the head remained at the superior strait, buttonholed between the tumor behind and the pubic bone in front. It became impossible to deliver the head without severing it from the body. After delivering the body, I passed my hand into the uterus, grasped the head, and, after considerable difficulty, succeeded in delivering it.

There was considerable hemorrhage, which was soon controlled, and the patient placed in bed very much exhausted from shock and loss of blood. My patient never rallied, but sank, and died in less than an hour from the time of the operation.

The question very naturally arose in my mind: Would her chances have been better had the advice which I first gave been followed? In other words, would it not have been a better course to allow gestation to go on to full term, and then deliver by abdominal section, before her strength had been exhausted by the pains of labor? It is to this special question that I shall direct my argument.

So far as I have been able to ascertain, there is very little literature on this important subject, and very little light to guide the physician in the management of such cases.

I am indebted to my friend, Dr. H. G. Beyer, of Washington, D. C., for a review of the German literature touching this question, to be found in the Surgeon-General's catalogue. The following cases were furnished by Dr. Beyer:—

1. Halist only gives a résumé of some cysts complicating pregnancy, tells of a few cases, and says nothing on the subject of treatment.

2. Hermann reports a case of myoma of the uterus complicating pregnancy; he seems to have looked around considerably, trying to find out as much as possible what the treatment should be in cases where delivery was impossible through the vagina, but found nothing on the subject that could be construed as guiding rules by which to go. Here and there he found suggestions as to turning, perforation, and Cæsarean section.

3. Klaproth reports a case of multiple fibroids growing from the walls of the uterine cavity, large ones and small ones, filling the entire cavity; proved fatal to both mother and child. Klaproth says nothing of treatment of such cases, but simply reports the case as he found it.

4. Lüdicke's case was one of a uterine fibroid, of the size of a man's head, and situated on the left side, occupying rather an anterior position within the cavity of the uterus. In this case the child was delivered without any trouble.

5. Mayer's case was another fortunate one. He says: Upon his arrival the ch was dead, on account of much time having been wasted by a midwife who had be called in when pains first came on. Delivery appeared impossible, and preparatio were already being made for Cæsarean section, when, on reëxamination, Mayer fou that the tumor was movable, and he succeeded in pushing it upward and above t body of the child, the tumor having quite a pedicle. Delivery was quite easy af that had been accomplished.

This tumor proved to be a fibroid growing from the posterior wall of the body of t uterus. Dr. Beyer says: From this brief review of the literature at my disposal think that the subject must have been treated of but very little. I am quite sure th if there was anything definitely settled as to the treatment of such cases, something the subject would have been found in the "Surgeon-General's Catalogue."

In order to ascertain the opinion of our most experienced physicians and surgeo I sent a circular letter to the most eminent men at home and abroad, containing t following questions:—

1. Among what class of women do uterine fibroids most frequently occur?
2. Are they found most frequently in married or unmarried women?
3. At what age most frequently found?
4. What forms of fibroids are most frequently met with? Submucous? Interstiti Subserous?
5. To what extent are uterine fibroids a cause of sterility?
6. To what extent are uterine fibroids a cause of miscarriage?
7. When a large interstitial uterine fibroid, occupying and well nigh filling the p vic cavity, is complicated with pregnancy, is it better to induce abortion or premat labor, or to allow gestation to go on to full term, and then deliver by abdominal sectio
8. What is the best method of inducing premature labor?
9. What form of abdominal section is best suited to such cases? (*a*) Cæsarean sectio (*b*) Porro-Müller operation? (*c*) Laparo-Elytrotomy?

Answers by Prof. T. Gaillard Thomas, of New York:—

1. In the African race and in leuco-phlegmatic temperament among the white r
2. I do not think that any rule prevails as to that point.
3. From 30 to 45.
4. This could be settled only by carefully-kept statistics, and such I have not
5. A very frequent cause.
6. When resulting in retroflexion or anteflexion, a frequent cause.
7. To deliver *per via naturales* whenever possible; the degree of free space de us as to the appropriate time for emptying the uterus.
8. ——
9. This would depend entirely on the size, location and general characters tumor. The question cannot be dogmatically answered.

Answers by Dr. Stansbury Sutton, Pittsburgh, Pa:—

1. The African race is the most predisposed to fibroids of the uterus. white race they are found among all classes, rich and poor, about equally dis
2. Unmarried most frequently, but frequently among married women.
3. From 20 to 30 most frequently, rarely under 18 years of age.
4. Submucous, 3d; interstitial, 2d; subserous, 1st. 1st, most frequent, 2 frequent, 3d. rare.
5. To a very great extent where they exist.
6. The patient is very liable to abort.
7. 1st, If the woman is not suffering too much, I would advise delay; for such women go to term, and have seen the tumor disappear in the subsequ of uterine involution. 2d, If the woman went to full term, and the tu

delivery, I would do Cæsarean section, after Sänger's method, and then remove the ovaries, and, if possible, the tubes.

8. The insertion of an English gum bougie between the membranes and walls of the uterus, to be left until uterine tenesmus is established.

9. It depends upon the case entirely; no absolute rule will do. (*a*) removal of the ovaries or ovaries and tubes. (*b*) In cases where you can make a good pedicle, the tumor being well up. (*c*) Can only be made where the tumor is not in the way.

Every case should be a law unto itself. The surgeon should be able to adapt himself to the requirements of his case; otherwise, he has no business to attempt to operate.

Porro's operation is a good one, and I have now three women living and in good health after it, in cases minus pregnancy.

I am disposed to regard Cæsarean section after Sänger's method, and removal of the ovaries, in such cases, with much favor, especially in cases where death is almost sure to follow a Porro or Porro-Müller operation.

Answers from Dr. James R. Chadwick, of Boston:—

1. In erotic women and prostitutes.

2. Married.

4. Interstitial and subserous.

5. Considerable extent.

6. In answer to this question, Dr. Chadwick refers me to a report of ten cases which he had published in 1885:—

"The results of these ten cases of pregnancy and labor complicated with fibroids may be thus summarized:—

| | |
|---|---|
| Miscarriage | 1 case. |
| Recovery of mother | 7 cases. |
| Death " " | 2 " |
| Living child | 7 " |
| Still-born child | 2 " |

"With regard to miscarriage, it has been shown by Lefour that this effect of the complication of pregnancy with fibroids is not so common as might be expected. In 227 cases which he cites, miscarriage occurred but 39 times, which is once in 5.82 cases. These figures show no more liability to miscarriage than in cases of pregnancy uncomplicated with fibroids."

7. Better to induce abortion unless fibroid can be lifted out of pelvis when patient is under ether.

8. Catheter inserted and kept some time in uterine cavity.

9. (*a*) Always. (*b*) Impracticable when fibroid is fixed in the pelvis. (*c*) Never.

Answers from Dr. Wm. Goodell, of Philadelphia:—

1. Sterile married women and old maids.

2. Sterile married women.

3. 35 to 45.

4. Interstitial first, subsereous second and submucous third.

5. They are far more the result of sterility than its cause.

6. Pregnancy rarely takes place; but if it does, miscarriage usually follows.

7. Induce abortion or premature labor.

8. Introducing a flexible lint bougie into the womb, between it and the membranes: it never fails.

9. Cæsarean section, Sänger's method; next, Porro-Müller operation.

Answers from Lawson Tait, Esq., Birmingham, England:—

1. All sorts.

2. In both equally, as far as I know.

3. 35–40.
5. I should say 98 per cent.
7. I should say the latter would be the safer proceeding.
8. Tait's dilators.
9. Porro-Müller operation.

Answers from Dr. Gilman Kimball, Lowell, Mass.:—

1. This question seems too general to be easily answered.
2. I think more frequently in married, but don't feel quite certain.
3. Between 25 and 40 years.
4. I don't feel quite sure, but am inclined to think, interstitial.
5. It seems to interfere with conception most decidedly.
6. I have found that they often induce miscarriage.
7. I would advise procuring premature labor in the manner above named. In two cases of this kind my patients allowed to go to full term. One died in process of parturition; the other was delivered of a living child. In both these cases I had arranged for abdominal section, but the patients lived some forty miles away and I was not sent for. It was a curious fact that one of the patients had been married nineteen years before becoming pregnant, and the other eleven years—neither of them ever miscarried.
8. In answer to this same question put to Sir James Y. Simpson, some fifteen years ago, his answer was in these words, Inject warm water.
9. No experience.

Answers from Dr. Robert P. Harris, Philadelphia:—

1. They are found much the more common in the negro and mulatto.
2, 3 and 4. The above questions can only be answered by an extensive research in the journalistic literature of one of our largest medical libraries.
5. Very few cases, comparatively, are found pregnant.
6. Much will depend upon the character and location of the tumors. I saw one woman who went to maturity, having seventeen subserous fibroids; another, now in labor, has four of them. She is also at term. She was safely delivered without forceps. She had not been pregnant for seven years.
7. In this particular form of fibroid it is safer to bring on premature labor. The Cæsarean section should be avoided, on account of its fatality. Enucleation of the mass may be accomplished and the woman saved.
8. The safest is the introduction of an elastic catheter between the amnion and uterine walls, avoiding the tumor side if possible.
9. The old operation as improved by the uterine suture method of Sänger, Garrigues and Leopold. (*a*) This has proved fatal in the United States ten times in thirteen cases. Pelvic tumor cases (not uterine) have been less fatal. (*b*) The condition of the cervix would generally render its ligation almost, if not quite, impossible. While the uterine neck is normal, labor often accomplishes the birth, aided by the forceps. (*c*) This is inadmissible, as a general rule.

Answers from Dr. Charles C. Lee, New York:—

1. Among sterile women of middle age, and especially in the negro race.
2. In unmarried women; or, at least, in nullipara.
3. At middle age—from about 25 to 50 years.
4. Subserous, generally. Interstitial when found early.
5. To a decided extent, and sterility from other causes equally tends to their development.
6. To a yet greater extent than of sterility.

7. It is always best to induce premature labor, if delay until the child be viable is possible; if not, induce abortion.

8. This will vary with each case; commonly, by the ordinary method with Barnes' dilators.

9. Porro-Müller operation.

The following are the answers by Dr. Henry O. Marcy, Boston, Mass.:—

1. Think my percentage greater in African race.

2. Sterile married women.

3. After 30 to menopause.

4. Interstitial.

5. A very common cause.

6. As a rule.

7. Miscarriage will generally follow; generally, I think, induced labor is safer.

8. Introduction of a coiled-up catheter or bougie; dilatation, and when once labor has commenced, completing it as an aseptic surgical operation.

9. This will depend upon the case—may be either *a*, *b* or *c*.

Answers of Dr. H. H. Hill, Augusta, Me.:—

1. Those women who have lived in luxury and without much employment.

2. Most frequently, I think, in married women.

3. Should say from 25 to 30 to menopause.

4. I have found more frequently the interstitial type, and located in the posterior half of the uterus.

5. I should say a large majority; especially when the tumor has attained much size.

6. I am unable to answer this question satisfactorily to myself.

7. I should prefer much to cause an early miscarriage, as the safest method of getting out of the trouble.

8. I should prefer the introduction of an elastic bougie or catheter into the cavity of the womb, and confine it there until the object of it was accomplished.

9. I can answer this question only by saying, that I should judge of the case before me, as to the best method of operating, without much reference to the particular mode of any one.

Answers of Dr. S. C. Gordon, Portland, Me.:—

1. I think among colored women. Among white women there is but little difference.

2. Unmarried, or women who have never borne children.

3. From 30 to 40.

4. Subserous.

5. To a very great extent.

6. I think not a very common cause of miscarriage.

7. If the position of the uterus be normal, and pregnancy be discovered within the first half of gestation, I believe the better way is to procure abortion. If in malposition (considerably), I think it much safer to wait until full term and make abdominal section.

8. By the introduction of large rubber catheter, and allow it to remain until labor begins.

9. That must depend upon size and situation of tumor. If tumor be small and favorably situated, I believe Cæsarean section better; otherwise, Porro-Müller.

Answer of Dr. A. J. Fuller, Bath, Me.:—

7. If hard, and nearly filling the pelvic cavity, I should not hesitate to induce abortion in preference to premature labor. That is my opinion, formed from past experience.

Answer of Dr. I. T. Dana, Portland, Me.:—

7. Induction of premature labor (seventh month), if examination shows delivery to be possible *per via naturales;* by abdominal section, if otherwise.

Answer of Dr. Hugh M. Taylor, Richmond, Va.:—

7. Would advise to allow gestation to go on, as in a majority of cases development of the uterus will cause interstitial fibroid to rise above and out of pelvis. Have noticed increased tendency to hemorrhage at time of parturition.

Answer of Dr. J. Blake White, New York :—

7. Induce abortion if tumor is discovered before the fourth month; otherwise, wait until full term, and then deliver by abdominal section.

Answer of Dr. George Ross, Richmond, Va.:—

7. Induce abortion.

Answer of Dr. S. Langhton, Bangor, Me.:—

7. My opinion would be in favor of inducing abortion or premature labor.

The following interesting table was sent to me by Dr. A. P. Dudley, of New York, taken from the records of the Woman's Hospital:—

| No. | Name. | Married or Single. | Age. | First trouble at | Native. | Children. | Mise. | Form of Fibroid. | Treatment adopted. | Result. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mrs. M. | 37 years | 53 | 43d year | German | 3 | 0 | Interstitial | Extirpation of Uterus | Death |
| 2 | Mrs. C. | 11 " | 43 | 35th " | Irish | 0 | 4 | Multiple | Hysterectomy of Uterus | " |
| 3 | Mrs. Q. | 21 " | 42 | 35th " | English | 5 | 3 | Single Subperitoneal | No Op. Pessary | Improve[illegible] |
| 4 | Mrs. O. | 17 " | 41 | 38th " | English | 0 | 1 | Single Subperitoneal | " " | " |
| 5 | Miss A. | Single | 55 | 40th " | Scotch | 0 | 0 | Single, in Post. Wall | " " | " |
| 6 | Mrs. P. | ..... | 45 | 42d " | U. S. | 0 | 0 | Submucous, in Fundus | Curetted | " |
| 7 | Mrs. B. | 13 years | 40 | 30th " | U. S. | 0 | 0 | Single, in Post. Wall | Pessary | " |
| 8 | Mrs. R. | 10 " | 37 | 35th " | U. S. | 0 | 1 | Subperitoneal, in Ant. Wall | " | " |
| 9 | Mrs. K. | 10 " | 27 | 25th " | English | 1 | 0 | Subperitoneal, in Ant. Wall | " | " |
| 10 | Miss D. | Single | — | 2 yrs. back | Irish | .. | .. | Multiple Subp. from Post. Wall | " | " |
| 11 | Mrs. A. | 15 years | 37 | Unknown | U. S. | 0 | 0 | Single Subp. in Post. Wall | " | " |
| 12 | Mrs. M. | 4 " | 25 | 22d year | U. S. | 1 | 0 | Single, in Ant. Wall | Ergot. | " |
| 13 | Mrs. M. | 25 " | 45 | Many yrs. | U. S. | 0 | 0 | Interstitial, in Ant. Wall | Curetted | " |
| 14 | Miss McL. | Single | 30 | 24th year | Canada | .. | .. | LargeInterst.,in Ant. Wall | Hegar's Op'n | Cured |
| 15 | Mrs. B. | 24 years | 42 | 20th " | U. S. | 1 | 0 | Subperitoneal | Curetted | Imp. |
| 16 | Mrs. M. | 17 " | 37 | 26th " | U. S. | 2 | 0 | Single, in Post. Wall | Bozeman's column packs | Imp. |
| 17 | Mrs. G. | 22 " | 44 | 27th " | U. S. | 2 | 0 | Subperiton. and SubmucousFibroid Polyp. | Latter removed | Death |
| 18 | Mrs. P. | 28 " | 49 | ..... | U. S. | 5 | 0 | Subperitoneal, in Ant. Wall | Ergot | Imp. |
| 19 | Mrs. B. | 16 " | 36 | 25th " | U. S. | 0 | 1 | Subperitoneal in Post. Wall | Tonics | " |
| 20 | Miss D. | Single | 25 | 19th " | S. America | .. | .. | Subperitoneal very large | Curetted | " |
| 21 | Mrs. L. | 15 years | 38 | 28th " | U. S. | 0 | 0 | Small, in left Lateral Wall | Cotton tampon by Bozeman | " |

Answer of Dr. T. A. Foster, Portland, Me.:—

[illegible]tion or premature labor, if we know the above condition exists.

[illegible] the answers of the circular letter, that nine men

of thirteen were in favor of inducing abortion or premature labor, while only four were in favor of allowing gestation to go to full term.

One was in favor of inducing abortion if the condition was recognized before the fourth month; otherwise, he would allow gestation to go on to full term, and then deliver by abdominal section, if found necessary.

The answers to the questions in the circular letter show that nine out of thirteen representative physicians and surgeons are in favor of inducing abortion or premature labor in such cases as stated in the seventh question. This, I think, is a fair indication of the views held by the profession in general. I believe the time is coming, and I hope is not far distant, when this rule will be reversed. The rule being to allow gestation to go on to full term, and the exception being the induction of abortion or premature labor.

We say, what I believe to be true, whenever a woman who is five or six months pregnant at the most has less than two and a half inches in the smallest diameter of the pelvis, we are justified in producing abortion. In a case of uterine fibroid, the indications are not as rigorous as in pelvic contractions. In a grave case, but one in which the issue is only probably favorable, we may conclude to induce labor after the seventh month; the danger to which the mother is probably exposed certainly legitimizes an operation which affords considerable chance of saving the child's life. The same is, by no means, the case as respects the production of abortion; here it is no longer sufficient that the mother's life is probably compromised; it should be almost certain that death is imminent.

In cases of uterine fibroids, the history of cases of pregnancy complicated with large uterine fibroids, shows that during the last week the tumor may rise out of the pelvis, and the labor go on uninterruptedly. This failing, we have another chance of saving both mother and child, by abdominal section. The increasing success attending the removal of the fœtus by laparotomy, together with the knowledge that frequently during the last week of pregnancy the uterus, together with the tumor, rises out of the pelvic cavity, should cause us to hesitate much more than we have, before sacrificing the life of the child. The one sole condition under which the physician is justified in taking the life of the child is when the pelvis is so deformed that it is certain the child cannot, by any possible means, be delivered. The presence of a uterine fibroid is very different, in my judgment, from the contraction of the pelvis to such an extent that its conjugate diameter is only one and a half inches.

Pregnancy complicated with uterine fibroids has two chances: 1st, it may relieve itself, and, 2d, we may perform laparatomy at full term. During the past year European operators, by the improved methods of Sänger and Leopold, have saved eighteen out of twenty women, and nineteen children. It is true we have not had so good success in this country, but what has been done in Europe can be done in America, and we should be governed by the best statistics, in a matter of such vital importance.

Guided by the light of abdominal surgery, I claim that in the vast majority of such cases as stated in the seventh question, it is better to allow gestation to go on to full term, and then, if necessary, to resort to abdominal section, without waiting until the patient's strength is exhausted by protracted labor.

The operation best suited to such cases is Cæsarean section, Sänger's method, and the removal of the ovaries, and, if possible, the Fallopian tubes.

## DISCUSSION.

Dr. Graily Hewitt, of London, opened the discussion and commended the paper very highly. It is a thankless duty to bring an unfortunate case before the Congress, and Dr. Weeks should have our admiration for doing so. He believed

it was now generally admitted that rapid evacuation of the uterine cavity in labor was a mistake. He would inquire whether, it being decided to evacuate the uterus, a better result might not follow if, at the time of operation, a more gradual process of evacuation were adopted? To prevent hemorrhage or shock, it is well to get the uterus into a perfectly acting state before emptying the organ, and to effect the process very gradually.

Dr. TRENHOLME spoke of the advisability of continuous treatment of uterine fibroids during pregnancy. Also, that the presence of fibroids does not preclude the hope of maternity. He had had three cases of labor complicated with fibroids, in one of which premature labor was brought on by a sessile tumor at the fundus of the organ. The result of the removal of the tumor was not favorable, and in such cases it is not advisable to interfere at the time, but wait for a fortunate occasion. Another case, where the tumor occupied the left wall of the uterus, post-partum hemorrhage ensued, which was controlled with difficulty.

Subsequently, this patient became pregnant and aborted at the fourth month. The patient passed about eight ounces of pus before the expulsion of the ovum, and the site of the tumor was found to be below the level of the surface. This patient had had several normal parturitions since. The third case was that of a woman aged forty-five years, having been married twenty-five years. There were several tumors, one at least of twenty-five pounds weight, and yet this woman became pregnant, and was safely delivered, at the eighth month, of a living child. The tumors have since almost disappeared, and the patient is in good health. The disappearance of fibroids after parturition may be confidently looked for, and this has been my experience. He believed evacuation of the uterine contents should take place slowly.

Dr. A. E. A. LAWRENCE, Bristol, England, said that the first question to decide is whether a woman who has a fibroid uterus should marry.

If she had no symptomatic troubles she might marry, if it was put clearly to her that she would probably never become pregnant, and if she did she might miscarry, or have a more serious labor than an ordinary woman; yet she should be made aware that women with fibroid tumors have become pregnant and gone on to their full time and had living children, and did well themselves. Dr. L. mentioned five cases occurring in his practice.

1. Lady with large abdominal fibroid became pregnant three successive times, bearing each time a living child, and having no labor complication and doing well herself.

2. Lady with large abdominal fibroid uterus became pregnant, then miscarried at six weeks. Again became pregnant and went full time, giving birth to a living child and doing well herself.

3. Lady with large fibroid uterus became pregnant. First time miscarried at six weeks. Second time labor induced at six months, on account of obstruction of bowels, which could not be overcome because of mechanical effect of tumor and pregnant uterus combined.

4. Pregnancy went to full time; living child.

5. Pregnancy went to full time; living child; perfect recovery.

A most important point in this case was that at each successive pregnancy there was a slight increase of the tumor, but subsequent to each confinement there was most marked diminution in the size of the growth, until after the last confinement the tumor disappeared altogether. Two other cases were recorded pointing to similar conclusions.

Dr. L. considered that the treatment depended upon the situation of the tumor. If the uterus could not rise out of the pelvis, or if the neck or lower segment were affected, then abortion *must* be induced; but if the tumor was situated in the upper zone of the uterus, then labor may go on, bearing in mind the special dangers of (1) weak uterine action, which could be met by the aid of forceps; (2) hemorrhage, from the uterus being unable to contract properly, which can be met by local astringents; (3) and septicæmia, met by frequent antiseptic injections.

Dr. L. most strongly deprecated the present tendency to resort to abdominal surgery in treating midwifery complications, such as those already mentioned and placenta prævia. We should strive to obtain the utmost manipulative skill so as to deliver *per vias naturales*, and not fly to operations so dangerous to the mother. There are men who say that craniotomy ought not to be performed, or that, in the interest of the child, the mother should have abdominal section performed on her.

Dr. L. does not subscribe to this doctrine, and says a man attending midwifery should be an accoucheur first of all, and an abdominal surgeon secondly. No man, he says, has a right to lay down the line of treatment in midwifery complications, except an experienced accoucheur, no matter how eminent the abdominal surgeon may be.

Dr. GORDON said: In the absence of Dr. Weeks, who is to close the discussion, I would like to say one word, inasmuch as I formerly had this case under my own care and she passed into Dr. Weeks' care in my absence. I feel quite sure that the position of this uterus (completely retroverted and the os lying up behind the pubes and to the left) was *prima facie* evidence that no abortion should have been attempted. Where the uterus cannot be drained of blood and serum, I should always fear fatal results.

I fully agree with Dr. Graily Hewitt that the slow, gradual dilatation of the uterus is much safer than the rapid method of producing abortion. I think the shock, and consequent danger of peritonitis is very much greater.

A few words upon a point suggested by Dr. Lawrence, of England. The situation of the tumor should determine our mode of procedure. A case in my own practice may be cited in illustration, where pregnancy was complicated with a large tumor in the anterior wall, in the lower segment of the uterus and entirely in the cervix, near the os uteri. I feared that we should not obtain dilatation if the pregnancy was allowed to go on to term, so I procured abortion at three months, when it was with some difficulty that the head was delivered.

I believe in similar cases we are justified in resorting to the latter procedure. Whether absorption would have been accomplished, I am in doubt, but I think I should advise the same course in a similar case. The position of the tumor should influence very largely our decision.

# UTERINE FIBROIDS TREATED BY ERGOT.

## TRAITEMENT DU MYOME UTÉRIN PAR LE SEIGLE ERGOTÉ.

## BEHANDLUNG DER UTERUSMYOME DURCH MUTTERKORN.

BY DR. DANIEL T. NELSON,

Chicago, Ill.

It is well known by the profession that Hildebrandt, in 1871, reported cases of uterine fibroids treated by ergotine hypodermically, with very favorable results, and in 1875 another series of cases, with similar results. In 1875, Prof. Wm. H. Byford, M.D., of Chicago, in an address* before the American Medical Asssociation, reports a further series of 101 cases treated with ergot administered in various ways, including those of Hildebrandt, and in June, 1876,† in a paper before the American Gynæcological Society, first advises the treatment by ergot of certain forms of fibroid tumors of the uterus, to produce their artificial destruction and expulsion, and reports three cases. He says, as to the cause of failure: "In some instances we shall find the cause in the deterioration of the drug, and in the unfaithfulness in its preparation, while in other instances in the mode of administering it. In a few cases we shall find a rational explanation in the condition of the uterus."

"We do not expect ergot to produce painful and efficient contractions in the healthy unimpregnated uterus; its fibres are not capable of such contractions, and it is not until the muscular fibres have become greatly developed that they are susceptible to the action of ergot."

"In tumors of the uterus the development of the muscular fibres is sometimes so slight that they are incapable of contraction; there are so many nuclei of degeneration that there are not enough sound fibres for efficient contraction."

"When, however, there are but one, two or three nuclei of morbid growths, as they increase in size, the fibres undergo the development necessary to enable them to contract with great efficiency, and render them susceptible to the influence of ergot."

"Another condition which influences the hypertrophy of the fibres, is the situation of the tumor. Subperitoneal tumors do not cause as great growth of fibres in the neighborhood as the interstitial or submucous varieties."

"A single interstitial tumor causes great development of the whole uterine tissue, but the development of the wall in which it is situated decidedly predominates. The submucous neoplasm so soon gains the uterine cavity that the development is nearly the same in the whole organ."

"When, therefore, we administer ergot for the cure of fibroid tumors of the uterus by compression or expulsion, the beneficial action of the drug will depend upon the degree of development of the fibres of the uterus and the position of the tumor with reference to the serous or mucous surface. The nearer the mucous surface, the better the effects. If the tumor is very near the lining membrane, we may hope for its expulsion en masse, or by disintegration."

"We can often select the cases in which good results may be expected. These are from conditions which are usually relatable for the purpose. They are: smoothness of contour, hemorrhage, lengthened uterine cavity, and elasticity. A smooth, round tumor denotes, for the most part, uniform textural development; hemorrhage, a certain

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* See *Transactions of Amer. Med. Asso.*, 1875.

† See *Transactions of Amer. Gyn. Soc.*, Vol. I, p. 168.

proximity to the mucous membrane; a lengthened cavity, great increase in the length and strength of the fibres; and elasticity assures us of the fact that cartilaginoid or calcareous degeneration has not begun in the tumor. Of course, the converse conditions would be unfavorable to the success of the ergot treatment."

"The mode of administering ergot, and the quantity given, influence the results of treatment very materially A few patients will not tolerate it when given by the mouth, but will be able to obtain all the effects from suppositories per rectum or per vaginam, while others will probably do better when it is given hypodermically."

"The time required for ergot to produce its full effects, when given in sufficient doses, is very different in different cases. Sometimes the first few doses are sufficient, sometimes it is necessary to give it for months, even a year or more."

"It may be proper to state that I have given ergot freely for a protracted length of time to many patients, and that I have never seen any of the acute or chronic toxic effects described by the older authors."*

It will be the object of this paper to continue these reports of cases treated by ergot. In December, 1886, I sent circulars (over 4000) to the members of the American Medical Association, asking for reports of cases, and received replies from over 200 physicians, and reports of nearly 150 cases from about 100 physicians. Some of these reports are so incomplete as to be of little value and have been omitted, while those thought to be of value are incorporated in this report, though, from the incomplete records kept by many, are not as full as we could wish. If the physicians who hear or read this report will keep records of their cases treated by ergot hereafter, somewhat according to the blank form appended to this paper (p. 652), and kindly send them to me, or to some medical journal for publication, I shall be glad to continue these reports at some future time, and it will greatly facilitate future investigations of this subject. It will also aid in deciding what seems to me a very important question, viz., first, what cases or forms of fibroid tumors of the uterus are amenable to medical treatment alone, and how long should it be tried before surgical measures are resorted to; second, what remedies, doses and modes of administration are to be preferred; third, when should medical and surgical measures be combined; fourth, when are surgical means alone, if anything, to be of advantage to these unfortunate patients. I need not add that the reports of unsatisfactory cases are even more valuable than the successful ones in determining these questions. And in fatal cases, a post-mortem is important, and in all cases, when removed post-mortem or expelled during life, a microscopic examination, by a competent person, is equally desirable, to determine the exact nature of the tumor.

We have adopted the usual classification of subserous, interstitial and submucous, as being, at the present, the most satisfactory.†

We have used the term fibroid tumor, because the one most commonly used, and so least likely to be misunderstood, even though it may not be the most scientific, and the one best to be finally adopted.

I have not intended to include in these cases any tumors properly termed sarcoma or carcinoma, but only those rightly denominated myoma, fibro-myoma, fibroma and fibro-cystoma.

CASES.

1. A. F. PATTEE, M.D., 94 W. Springfield St., Boston, Mass., reports:—

Mrs. T. C. F.; aged 75 years; puberty at 16 years; married at 25 years. Had two children. Menstruation regular; no pain until tumor appeared. Leucorrhœa yellowish, constant. Menses and leucorrhœa began to be profuse at the age of 41 years. Tumor noticed at the age of 42 years, with an estimated diameter of four inches. Used rye

* See "Amer. Clinical Lectures," Vol. III, No. 7.

† See "Diseases of Women," by Wm. H. Byford, M. D. 3d edition. 1881. Page 481.

ergot infusion from December, 1860, by the mouth and rectum, and by a compress moistened with infusion, above the pubes, in doses of one ounce every four hours, not increased, using in all three pounds best whole ergot. The hemorrhage was controlled in eight days. The diagnosis was confirmed, by the late Dr. Sparhawk, of Amesbury, and Dr. Perkins, of Newburyport, Mass., to be interstitial.

2. J. W. C. O'NEAL, M.D., of Gettysburg, Pa., reports:—

Miss C. R.; seamstress; aged 43 years; puberty at 13 years; single. Menstruation regular; excessive pain at times. Leucorrhœa free, not constant. Menses began to be profuse about eight years ago. Tumor appeared about six years ago. Size of a gravid womb at eight months. Commenced the use of Fluid Extract of Ergot immediately on noticing an increase of size of tumor, by the mouth, in doses of ten minims, increased to thirty minims three times a day. Pains assimilating peritonitis, which continued until preparation was suspended, but after a time resumed. Did not get the desired advantage, but believe progress has been retarded.

3. CEPHAS PARK, M.D., Oquauka, Ill., reports:—

Mrs. M. H.; dressmaker; aged 44; puberty at 15 years; married at 41 years. No living children; two miscarriages; 1st, in November, 1884, 2d, in April, 1885. Menstruation regular; at times considerable pain. Tumor appeared at age of 37 years, July, 1880. Size of a gravid womb at eight months. Commenced the use of Fluid Extract of Ergot hypodermically once a day, for three months, and by the mouth ten minims every four hours. Resulted in arrest of growth and much pain. Patient has moved away, but it is reported that the tumor came away.

Dr. N. J. PINAULT, of Osseo, Minn., writes, August 22d, 1878:—

In Fall, 1884, was called to prescribe for Mrs. H., for profuse flooding. Gave Fluid Extract Ergot, which was continued from time to time as needed till April, 1885, when the tumor was expelled, a fibroid, three inches in diameter. "No doubt the use of the ergot, as stated, brought the result."

She has had no trouble since.

4. FRANK W. EPLEY, New Richmond, Wis., reports:—

Mrs. O. H.; aged 45 years; puberty at 13 years; married at 17 years; no children; menstruation regular, moderate, no pain; leucorrhœa, slightly yellow, scanty, not constant. Tumor appeared twelve years ago; diameter estimated eight inches. In July, 1887, commenced use of Squibb's ergotine, hypodermically, fifteen minims, increased during one month to thirty minims. Remarkable how few treatments were required to stop the growth, which previously had been increasing quite rapidly. Then reduced to a dose two or three times a week. This was ten years ago; the tumor has ceased growing. Also took thirty minims three times a day, by the mouth, between injections.

5. A. B. BOWEN, M.D., Maquoketa, Iowa, reports:—

Mrs. C. S.; aged forty-four years; puberty at fourteen years; married at twenty-two; four children, aged twenty-one, eighteen, fourteen and twelve respectively; two miscarriages, 1870 and 1874; menstruation irregular, excessive, considerable pain; leucorrhœa variable, which became profuse in 1885; menses in 1884; tumor appeared in 1885, size of an orange. One year ago commenced the use of Fluid Extract of Ergot, by the mouth, in doses of ten minims three times a day; in a few weeks increased to a drachm, at intervals, with no bad effects. But menorrhagia and metrorrhagia arrested, and tumor forced down into cavity of womb; now waiting for favorable time for its removal by division of pedicle, after more protrusion.

6. L. J. ADAIR, M.D., Anamosa, Iowa, reports:—

Mrs. S. J. I.; a widow; occupation seamstress; aged forty-two years. One child, now dead. Menstruation regular until 1881; always some pain. Leucorrhœa profuse, dark color, not constant. Menses began to be profuse in 1880. Leucorrhœa in 1882. Tumor first appeared in 1881, with a diameter less than one inch In Oct., 1885, commenced to use Squibb's Fluid Extract of Ergot, by the mouth, in doses of one-half to one drachm for three months. No bad effects except occasional nausea. There has been a gradual decrease in the size of tumor from the first, with improvement of all symptoms. At present patient believes herself well.

7. J. J. STONE, M.D., Argyle, Minnesota, reports:—

CASE I.—Mrs. L. S.; aged forty-five years; puberty at fourteen years. Married at twenty years. Had one child, aged twenty years. Had had one miscarriage. Menstruation not regular, very little, much pain attending. Leucorrhœa lasting four to five days. Tumor first appeared in 1881, after miscarriage; about the size of an egg. Commenced to give Ergot, Squibb's Fluid Extract, at the first of the excessive menstruation, three times a day. On the third day there was much pain, and opiates were needed, but the Ergot was continued, and after a little the tumor was removed by twisting it around several times. As far as I know is still healthy.

8. CASE II.—Mrs. B. T.; aged forty-three; puberty at fifteen years. Married at eighteen years. Has three children, aged twenty-three, twenty and sixteen years, respectively. Menstruation regular, normal, no pain. Tumor appeared in 1882, soon after birth of last child, and was larger than an egg. Began the use of Squibb's Fluid Extract of Ergot in usual doses. Treated for nearly two years, when the tumor was removed as in previous case, and since has had good health.

9. F. E. WAXHAM, Thirty-fifth and Indiana Ave., Chicago, Ill., reports:—*

Mrs. M.; housewife; aged about forty-five years. Married; has several children. Menstruation regular, but too frequent and copious, no pain. Leucorrhœa considerable. A few months before applying for treatment menses became profuse. At time of examination tumor noticed, with a diameter of about five or six inches. Fluid Extract of Ergot was used immediately, by the mouth, in doses of one-half teaspoonful, increased in two weeks to one teaspoonful for about two months. Much pain was caused, but the tumor was expelled.

10. D. W. HAND, M. D., 137 W. Third street, St. Paul, Minn., reports:—

CASE I.—Mrs. J. W. N.; aged nineteen years; married only six months; had profuse bleeding. A fibroid tumor was discovered, size of an orange. She had profuse leucorrhœa, and frequent and alarming hemorrhages. For over two years she took fluid extract of ergot, and tumor was reduced one-half. Became pregnant, but miscarried at the fifth month. Five years ago had a living child, and ever since been in good health. One year ago had a second child, and upon careful examination the only sign of old tumor was a lump the size of a walnut in the anterior wall. Has not taken ergot for five years.

11. CASE II.—Mrs. L. E. C.; aged forty-seven years; puberty at fourteen years; married at twenty-two years; has no children. Menstruation fairly regular, not profuse, little pain. Leucorrhœa not troublesome. Tumor first noticed about eleven years ago. Size, four to five inches in diameter. Commenced the use of fluid extract of ergot in 1876, in doses of twenty minims three times a day; increased to thirty minims. No bad effects, except got tired of it; good effects within a month. She is now tolerably comfortable and in good general health.

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* Reported Sept., 1886, *Chicago Medical Journal and Examiner.*

12. J. P. WILSON, M. D., Sherman, Texas, reports:—

CASE I.—Mrs. A. J.; age at death sixty-two years; had three children. Menses regular up to menopause. Leucorrhœa rather thin, yellowish, slightly offensive, sometimes profuse, not constant. Had hemorrhage at irregular intervals. Tumor appeared at the age of forty-eight years, and was at time of death three inches in diameter. At the age of fifty-nine years commenced the use of Squibb's fluid extract of ergot, by the mouth, in one-half drachm doses three times a day, gradually increased to one drachm, for nearly three years. After six months there was a perceptible diminution in size of tumor, which lasted for more than a year. Tiring of the remedy, discontinued its use, when tumor grew rapidly, but on resuming ergot after a time growth was checked, but size did not diminish up to death, which her attending physician said was from cystitis, caused by pressure of tumor.

13. CASE II.—Mrs. Mary R.; a negress; aged forty-nine years at death; had four children. Menstruation irregular, profuse some months before tumor was observed, frequently with pain. Leucorrhœa viscid, whitish, tenacious, constant, profuse and bloody three months before death. Tumor appeared at the age of thirty-eight years, at time of death the diameter being three and one-half to four inches. At the age of forty-two years commenced the use of wine and fluid extract of ergot. Wine, one-half to two drachms; fluid extract, one-half to one drachm three times a day. Owing to nausea, indigestion with constipation, was discontinued for six months. Preceding which time it dwindled in size, but began to increase, when ergot was again administered; then passed out of my hands. Ceased use of ergot, tumor increased in size, and died six or eight months since, of the effects of the tumor, her attending physician said.

14. THOS. D. STRONG, M. D., Westfield, N. Y., reports:—

CASE I.—Mrs. W.; aged about forty-six years. Menstruation began to be profuse in 1884; leucorrhœa in 1885. Tumor first noticed in 1883; appeared like a woman five months pregnant. The tumor was interstitial. She had frequent and violent hemorrhage; was anæmic and feeble. In 1886 commenced using Squibb's fluid extract of ergot by the mouth, in doses of one-half drachm three times daily; not increased for two years. Another year less doses and irregular. In three months hemorrhage had ceased and tumor perceptibly diminishing. After three years the tumor was not more than one-quarter its original size; would not be noticed except by palpation. No return of trouble since; recovered health.

15. CASE II.—In 1876 Mrs. W., aged thirty-four years; puberty at fourteen years; married at twenty years; had one child, aged twelve years; had had one miscarriage in 1872. Menstruation regular, began to be profuse in February, 1876. Tumor first noticed in 1875; appeared like one seven months pregnant. It was interstitial fibroid on the anterior wall of the uterus. Commenced Squibb's fluid extract of ergot in March, 1876, by the mouth, one-half teaspoonful three times a day, not increased except extra dose to arrest hemorrhage. Continued steadily for eighteen months, less regularly and smaller doses till 1878. Hemorrhage all ceased in 1878. Tumor less than half its former size, and good health. In January, 1881, tumor took on action again, with pain. In February an abscess was formed, discharged by os uteri and vagina, very profuse, gradually diminished. Patient was discharged in April, 1881. Tumor then had disappeared, no recurrence up to 1886.

16. J. P. ANTHONY, M. D., Sterling, Ill., reports:—

CASE I.—Mrs. E. A. S.; aged thirty-five years; puberty at fourteen years; married at twenty-one years. One child, aged eleven years. Menstruation regular; almost constant when tumor first appeared; no pain. Leucorrhœa profuse, thick and muddy; almost constant. Menses began to be profuse at twenty-seven years. Tumor noticed at twenty-eight years, with a diameter of three inches. In August, 1880, commenced

the use of fluid extract of ergot by the mouth, in doses of one drachm two and three times a day. Disagreed with the stomach, and used ergotine, ten to fifteen grains. Ergotine continued six months. Had not taken any for three years. Bad effects, numbness in feet and legs, and aching and weakness in all voluntary muscles. Good effects appeared soon after taking ergot. Think she will eventually die from the effects of the tumor. It is a question whether it may not become malignant.

17. CASE II.—Miss C.; aged thirty-four when she died; puberty at thirteen years; a teacher. Menstruation regular; slight pain. Leucorrhœa quite profuse. Tumor appeared in 1881. Commenced the use of fluid extract of ergot by the mouth, in doses of one-half drachm three times a day; in about two weeks changed to ergotine, two grains, three times a day; occasioning some pain in back and thighs. Good effects appeared in two weeks, and in eight weeks the tumor was driven down through the os till it protruded into the vagina. Then grasped it with a pair of heavy forceps and twisted it off. The uterus contracted, but secretion became offensive, and she died of septicæmia in eight days.

18. J. W. MCLAUGHLIN, M.D., of Austin, Texas, reports :—

CASE I.—Mrs. M. P., negress, aged about forty years. One child, about eighteen years old. Menstruation pretty regular, profuse, some pain. Examination revealed a tumor size of pregnancy at term, of about nineteen years' growth. Interstitial fibroid. Squibb's fluid extract, filtered and carbolized, was used hypodermically every second or third day, off and on, for twelve months; was greatly benefited, and tumor greatly reduced in size. She died a year ago; attending physician says from heart disease.

19. CASE II.—M. A. S., negro woman, about thirty-five years old, no children. Menstruation profuse, no severe pain. Tumor size of four months pregnant, six months' growth. Treated by Squibb's fluid extract of ergot, filtered and carbolized, hypodermically, every second day, irregularly; general health greatly improved; reduction of size of tumor. No treatment for six months; remains the same; menses normal.

20. CASE III.—Miss A., German, aged twenty years, single. Menses fairly regular, no severe pain, but profuse. Multiple subserous fibroids of several years' duration. Used Squibb's fluid extract of ergot, filtered and carbolized, hypodermically, every third day, until after three months. Severe uterine pains ensued. After a week's rest treatment resumed. Tumor reduced, health greatly improved, menstruation normal.

21. HENRY P. NEWMAN, M.D., 554 N. Randolph street, Chicago, Ill., reports :—

CASE I.—Mrs. H., a German, middle aged, having three children, no miscarriages; had suffered for many years from menorrhagia and metrorrhagia; profuse leucorrhœa. An examination revealed tumor filling hypogastrium, and within two inches of umbilicus, interstitial fibroma of anterior wall; depth of uterus four and a-half inches. Used the combined method of treatment, twenty to thirty minims of fluid extract of ergot by the mouth, or an equivalent of ergotine by rectal suppository. At the end of three months the patient was obliged to leave the city and lost track of her. But while under treatment health improved, the hemorrhages were checked and tumor reduced in size, giving promise of cure if treatment could have been continued.

22. CASE II.—A hard-working German woman, about forty years of age, no children, one miscarriage in early married life. Tumor was as large as head of new-born babe. Subserous fibroid attached by a broad pedicle to the anterior uterine wall. Patient under similar treatment as Case I, more or less constantly for nearly a year, with a marked benefit in health, hemorrhage controlled, growth of tumor checked and it was thought pedicle became smaller. At the end of this time a series of domestic calamities—a drunken and half-crazy husband, who ultimately committed suicide, hard work, exposure and poor living—resulted so disastrously to her general health and local

troubles as to render negative the benefits already acquired. Her condition soon became desperate in the extreme. She was confined to her bed a large part of the time, with hemorrhages, cramps and attacks of hystero-epilepsy. After a short sojourn in the County Hospital, with no relief, she became disheartened, and begged for the removal of the tumor. An exploratory operation was performed, and it was found that the pedicle could neither be ligated nor the growth enucleated, and the removal of the entire uterus was not thought advisable in her weak condition. Four days after she died, of peritonitis and septicæmia. This unfortunate case is of interest from the fact that the ergot treatment seemed to arrest growth of tumor as long as her adverse circumstances were under partial control; and it is fair to presume that, had the domestic condition been more favorable, she might have been carried along under the same treatment until the menopause, when probably there would have been no further growth.

23. D. W. Crouse, M.D., of Waterloo, Iowa, reports :—

Case I.—Mrs. C. F., aged thirty-three years; puberty at about thirteen years; married at twenty-six years. Menstruation regular, somewhat profuse, no severe pain; leucorrhœa varying in character, not constant. Tumor was discovered about four years ago, size of an orange, and increased in four months to the size of an infant's head, with protuberance on the neck in vagina, about the size of hen's egg, though not that shape. Immediately began the use of fluid extract of ergot, by the mouth, in doses of ten minims four times a day. After three weeks increased to fifteen minims, then used irregularly for some six or eight months. Had a little stomach trouble at times. The tumor grew less after the first year; decrease quite gradual now, though it does not change much; does not inconvenience her.

24. Case II.—Mrs. C.; had a small fibroid tumor, which was treated four months by mouth and hypodermically into the tumor, with marked improvement, when she became pregnant, and all signs of tumor were removed after confinement.

25. Case III.—Mrs. P. B., aged forty-three years, had a tumor the size of a man's head, and when called had had such frequent and severe hemorrhages that she was prostrated. Used ergot, five to ten minims, for a year and a-half, and it has reduced the hemorrhages.

26. Elisha Chenery, M.D., 65 Chandler street, Boston, Mass., reports :—

Miss E. A. D., aged thirty years; had severe hemorrhages for some time. Administered fluid extract of ergot, with equal quantity of compound spirits of lavender, in doses of one teaspoonful three or four times a day. Upon examination found a uterine fibroid of an interstitial character, about the size of a five-year-old child's head. The hemorrhage was controlled by the ergot, the treatment continued to contract the tumor. The patient regained her color and strength, and all the characters of usual health, except the enlargement remained. Twenty years have passed. She has safely passed the menopause, married, and, excepting the size and weight, suffers no inconvenience from the growth.

27. R. T. Henry, M.D., Princeville, Ill., reports :—*

Mrs. P. E. A., a milliner, about forty years old; married twice, with no children. Menses profuse, but regular. Tumor first noticed in December, 1857. Estimated weight, 2¾ ounces. Fluid extract of ergot administered by the mouth. Given for the controlling of the hemorrhage, which it did, and finally the expulsion of the tumor itself.

28. W. G. Eliott, M. D., Pontiac, Mich., reports :—

Mrs. F. H., aged forty-three; puberty at fourteen years; married at twenty years; seven children, aged 22, 20, 16, 14, 12, 2, and one died in infancy. No miscarriages. Menstruation regular, free, no pain. Leucorrhœa, mucus moderate. Menstruation and leucor-

*Reported in *Chicago Medical Journal*, Vol. xxvi, Nos. 17 and 18. Page 530.

rhœa commenced to be profuse the year previous to discovery of tumor, in 1880. It was situated in the left iliac region, about the size of an ordinary clinched hand. Os uteri patulous, body slightly pressed to the right. Commenced the use of ergot, Squibb's fluid extract, by the mouth, in doses of one-half drachm once in four hours, increased in ten days to one drachm, which disturbed nutrition, also diminution of menses in quantity and time of flow. About three months after the tumor became softer and gradually diminished in size. Two years and a half from the time of commencement of treatment scarcely any evidence could be found of any enlargement or tumor in that region. Patient in perfect health.

29. G. L. PRITCHETT, M. D., Fairbury, Nebraska, reports :—

Mrs. D., aged forty-six years at death; puberty at sixteen years; married twenty-eight years, having no children. Menstruation regular, profuse, at about thirty-four years. Leucorrhœa, purulent, profuse; at about thirty-seven years of age constant. Tumor first noticed at age of thirty-nine years. Began the use of Fluid and Solid Extract of Ergot about the age of forty-three years, in one-half to one drachm doses three times a day of fluid and two to four grs. of solid, for months. Patient died from exhaustion and absorption of pus, in the summer of 1886. The tumor or tumors were removed by operation at five different times; amount removed aggregated several pounds.

30. D. W. HARRINGTON, M. D., 1430 Main street, Buffalo, N. Y., reports :—

Miss B. M., aged twenty-four years; puberty at fourteen years; single. Menstruation, with slight pain, profuse for six months before the tumor appeared, seven and a half years ago. The size was that of pregnancy at fifth month. Commenced use of ergotine, hypodermically, in doses of twelve minims saturated solution ergotine with glycerine third or fourth day, for four months. The growth entirely disappeared in four months.

31. E. L. PATEE, M. D., Manhattan, Kansas, reports :—

Mrs. L. H., farmer's wife, aged forty years; puberty at thirteen or fourteen years; married at twenty; has two children, aged four and two years respectively. One miscarriage about 1873. Menses were regular, a little profuse, with pain. Leucorrhœa rather more than usual before conception. Tumor was first noticed in October, 1873. Merrill's fluid extract of ergot, in ten minim doses, three hours apart, was used by the mouth for about twelve days, when the tumor was expelled; then, seeing traces of other tumors, continued the ergot, thirty grains three times a day, for some three years, when all symptoms had disappeared.

32. J. B. FELKER, M. D., Amboy, Ill., reports :—

CASE I.—Mrs. R. D. W., aged forty-three years; puberty at fifteen years; married; no children. Menstruation regular, moderate, not particularly painful. Leucorrhœa very considerable, constant. Tumor appeared after two years of bad health, in 1884; size, ten or twelve inches. Commenced using Squibb's Fluid Extract of Ergot during the summer of 1884. Used by the mouth about fifteen months, hypodermically, nine months, in doses of twenty to thirty minims, three times a day, with no bad effects, except when given hypodermically caused chills and a deathly white appearance of the surface. Good effects commenced at once and continued for six or eight months, when she measured two inches less and weighed twenty pounds less, and had resumed her household duties. After this she moved away; has discontinued the ergot, and writes that her size has increased one inch, although general health remains good.

33. CASE II.—Mrs. H., aged fifty-five years; puberty at fifteen years; married at twenty years; no children. Menstruation originally regular; medium quantity, not much pain. Menses and leucorrhœa began to be profuse about fortieth year. Tumor appeared about forty-three or forty-four years, with a diameter of eight or ten inches.

Began using Squibb's fluid extract of ergot in the spring of her forty-fifth year, administered by the mouth, one-half teaspoonful three times a day, increased to one teaspoonful four times a day, for about four months, until it caused pain and some confusion of the mind, when it was stopped for awhile, but resumed as soon as she could bear it. After three months good effects began to appear, till about fifteen or twenty months the tumor entirely disappeared, and patient now enjoying good health.

34. A. N. TALLEY, M. D., Columbia, S. C., reports:—

Miss S., aged thirty-eight years; puberty at sixteen years. Menstruation somewhat irregular, sometimes excessive, no pronounced pain. Leucorrhœa occasionally tinged with blood. About eight years since menses began to be profuse, and six since tumor appeared, about the size of a large orange. Two years since commenced using fluid extract of ergot, hypodermically, in doses of thirty minims every second day, increased after a month to sixty minims daily; in conjunction with it in this form it was given as solid extract, in ten grain doses, thrice daily for nine months. In three months there was a visible diminution, and now, twelve months after, I hear she is entirely restored; tumor can hardly be felt.

35. J. HENRY MUSSER, Lampeter, Pa., reports:—

Miss S. F., aged fifty-three years; a domestic; single. Menses regular, rather free, little pain. Slight leucorrhœa. Tumor first noticed about the age of thirty-six years. Commenced using Squibb's solid aqueous extract of ergot in January, 1875, hypodermically, from ten to fifteen minims, in region of the umbilicus; afterward took fluid extract by the mouth for some months. Some pain from injections, and nausea when taken by the mouth. The tumors were subserous. She is now enjoying good health, when careful not to over-exert herself.

36. W. P. BRECHIN, M. D., Temple Hotel, Temple street, Boston, Mass., reports:—

Mrs. G. D., aged thirty-four; puberty at eleven years; married at twenty-two years; has no children. Menstruation very regular, always large quantity, and much pain. Leucorrhœa aqueous, large amount, nearly constant. Three years ago menstruation and leucorrhœa became profuse, and tumor appeared about the same time, about the size of a goose egg. Commenced the use of fluid extract of ergot, by the mouth, in doses of half a teaspoonful three times a day for one month, and then intermitted two or three weeks. After continuous use a feeling of constriction of the head. The tumor has remained stationary for two years, though slightly diminished.

37. J. A. REAGON, M. D., Weaverville, N. C., reports:—

CASE I.—Miss M. G., aged fifty-four years; puberty at fourteen years; single. Menstruation regular, normal, but little pain until tumor began to grow. Leucorrhœa profuse six months to a year before treatment. Tumor first noticed three months before expulsion. Commenced using fluid extract by the mouth one month before expulsion, in doses of one-half drachm three times a day, increased to one drachm. Tumor was expelled from the womb and twisted off with forceps. It was about four inches long and two inches in diameter. Health has been good since.

38. CASE II.—Mrs. R. P., aged forty-three years; puberty at fourteen years; married at eighteen years. Four children. Two miscarriages, 1862 and 1867. Menstruation regular until tumor appeared. Leucorrhœa watery, constant or nearly so. Tumor appeared in 1870, three inches in diameter. In the fall of 1870 used Squibb's fluid extract of ergot, by the mouth, in half drachm doses, increased to one and one-half drachms. Tumor was expelled from the womb in eight days, and I removed it. She has been in good health for sixteen years, with no recurring symptoms.

39. N. GULMAN, M. D., 1533 Carr street, St. Louis, Mo., reports—

Mrs. McD., aged about thirty years; married at twenty-two years. No children.

Menstruation irregular; profuse about a year before tumor was noticed. Leucorrhœa greenish, constant, and has been profuse for years. Size of tumor ten to twelve inches in diameter. Squibb's fluid extract of ergot, used by the mouth, twenty minims every three hours, continued for about four months. She has recovered.

40. INTRA-UTERINE FIBRO-MUCOUS TUMOR. READ BEFORE THE CINCINNATI OBSTETRICAL SOCIETY, APRIL 9th, 1885, BY JULIA W. CARPENTER, M.D., CINCINNATI, O.

Mrs. X., aged 41; married eighteen years; is the mother of three children, the youngest eight years of age. Between the second and third child she had two miscarriages, two years apart; one at two months, the other at four and a half months. She had always been strong and well and a good walker, and was of English parentage.

She came for advice November 5th, 1884, on account of a hemorrhage of the form of menorrhagia, the period being both profuse and prolonged. This had existed for nearly three years, and had increased steadily in quantity and length of time, until for the last six months there was an interval of only three days.

The first thing she noticed was, one day three years ago, a very slight discharge of water. After that the hemorrhage occurred. At no time in her life, before or since the trouble began, has there been any leucorrhœa, dysmenorrhœa or constipation.

She had always been a martyr to headaches, but since the hemorrhages they have been less severe. There was no pain at any time during the menorrhagia, but a "peculiar drawing sensation" in the pelvis and extending down to the knees.

An examination revealed the following condition: Cervix and os in a normal state. The body uniformly enlarged and extending to the umbilicus, like a six months' gestation. There was no fluctuation; the abdominal walls were somewhat thick.

As it was near the time for the hemorrhage to recur, I decided to see first what effect ergot would have upon it, and prescribed Squibb's fluid extract, half teaspoonful four times a day. This delayed the flow a few days and also diminished it somewhat in quantity. On the twelfth day after beginning the ergot I was summoned to the house with the statement that something was protruding. I found the cervix dilating and a red, fleshy mass was being expelled, and already extended outside the vulva. The cervix was dilated enough to pass the finger through without danger of injury to the part being expelled. A hard nodular mass was felt, attached on the right side, beginning at the internal os. The finger passed over this hard body to the left and then upward between it and the soft part that was being extruded.

The part that extended beyond the vulva I wrapped in a piece of linen covered with carbolized vaseline, and directed rest in bed and the ergot continued.

The following morning much more was expelled, and as it was beginning to slough at the end, I put on a ligature just outside the vulva and cut off a piece weighing nearly four ounces. This had about the consistence of liver.

By the next day still more was extruded, and outside the os it was so softened that it severed itself during an examination. These two masses, with some pieces passed during the day, weighed altogether nearly eight ounces.

The soft part of the tumor now remaining extruded about an inch outside the os, and as far as the finger could reach between the fibrous mass and the uterine wall on the left this soft portion, could be more easily investigated.

It had a broad base, and was attached on the right side from the internal os to the fundus, which was still nearly at the umbilicus.

The ergot was continued, and the day following the cervix was entirely obliterated; the dilatation of the os was about two inches, and the hard mass was bulging slightly from it. To bimanual examination the large rotund body of the uterus was harder, but there was also a perceptible, though slight, decrease in its size since the night before.

This was evidently due to a continuous discharge of a yellowish, slimy material, with pieces of glistening white fibrous tissue and red shreds and pieces.

I had expected to use surgical means for the removal of the tumor as soon as things came to a standstill, that is, when there was no further dilatation of os and extrusion of the tumor. But with the continuous discharge of débris, it seemed to me that by keeping up a persistent contraction of the uterine fibres, by the steady use of ergot, there was a possibility that the entire mass might be disintegrated and discharged. Owing to the large attachment of the tumor, this method of removal was preferable if other evils could be guarded against.

To secure absolute cleanliness and prevent the absorption of septic material, I myself gave vaginal injections of hot carbolized water, three times a day for five days, twice a day for ten days, and then once a day until the discharge had ceased.

In giving these injections slight pressure was made against the vulva in a way to prevent the too speedy outflow of all the water. The object of this was to keep the vagina somewhat distended with the water, to insure the cervix being entirely surrounded and bathed in it.

The ergot was continued and the patient carefully watched in every particular, especially the pulse and temperature, to catch the least intimation that this course was not a wise one.

The discharge of débris continued, some pieces of white fibrous tissue being an inch and a half long, half an inch wide and one-eighth inch thick. Bimanual examination each day showed a steady decrease in the size of the round uterine body.

The temperature a number of times fell below normal, but with a little stimulant or omission of one or two doses of ergot it was soon normal again.

The greatest dilatation of the os lasted about two days, when the cervix began slowly to reform. The discharge was very abundant for two weeks, then it gradually lessened in quantity, and at the end of four weeks from the first it ceased entirely.

As the uterus was not yet normal in size, the ergot was continued in diminished doses three weeks longer, with the effect of steady decrease in volume.

During that time, with ergot, she had one normal menstruation. Three periods have passed since then, and without ergot or any other medication whatever, two were five days in length and one seven. The quantity was normal. Her time before the hemorrhage was eight days. The sound passes now one-half inch beyond the normal length.

Her color began to improve as soon as a part of the tumor was removed. The numbness and swelling of the feet also ceased.

The ergot was taken altogether for two months and ten days, in varying doses, from two to four times a day. To prevent any disturbance of the stomach the ergot was given some days entirely by enema, and other days every alternate dose in that way. There was at no time the least nausea or disturbance of the stomach. Whenever the ergot gave any severe pain the dose was lessened, as the work seemed to be accomplished without painful contractions.

From the tenth day the patient began to sit up during short periods, and was soon allowed to be up in her room for most of the day.

Billroth, "General Surgical Pathology and Therapeutics, 1879," page 620, says: "Fibromata are capable of some anatomical metamorphoses. *Partial mucous softening*, great serous infiltration, calcification, and even true ossification, are not very rare."

41. Prof. J. F. Y. PAINE, M. D., Galveston, Tex., reports, in the *Journal of the American Medical Association*, Vol. v, No. 8:—

Miss V. E. G., aged forty-three years; native of Louisiana; of good social position; school teacher. Family history exceptionally clear. Personal health uninterrupted

until about two years preceding my first visit. In the early part of 1882 the patient began to experience unaccustomed sensations, which soon developed into positive disorders, such as abdominal and pelvic pains, irritability of the bladder and rectum, menorrhagia, leucorrhœa, etc. It was not until the early part of 1883 that she discovered anything unusual in the contour of the abdomen. The presence of two hard masses, one in the hypogastrium and the other in the right inguinal region, excited her apprehension, and she consulted a physician. From that period until January, 1884, the tumors had grown with such rapidity that the abdominal cavity seemed filled to its utmost capacity. Not only were the viscera compressed and displaced, but the walls and integumentary tissues were so distended that she suffered almost constant pain. Both her attending and consulting physicians are prominent practitioners in Galveston, and I have no doubt that their management of her case is above criticism. A frank prognosis on their part, however, determined her to dismiss them and employ other counsel. It was at this juncture that I was called, and from which period my notes date.

My first visit was made on January 27th, 1884, and I was impressed by the exsanguined face, anxious expression, rapid breathing, and feeble, unrhythmic pulse of my patient. Examination revealed an enormously distended abdomen, with skin so tight that it could not be pinched, and a hard, uneven surface. The uterus was decidedly retroverted, somewhat enlarged, and considerably below its normal plane. There were unmistakable evidences that pressure was impeding the functions of the bladder, kidneys, intestines, stomach, lungs and heart. Dyspnœa and irregular heart action caused great distress. The stomach was so compromised that only small quantities of food could be ingested, and even they were followed by various dyspeptic phenomena; the bowels were evacuated with difficulty; sleep was disturbed; pressure upon the sacral plexus gave rise to sciatica, which at times was agonizing. The patient was confined to her room and a considerable proportion of the time to her bed. Exhausting menorrhagia occurred every month. Measurements of the circumference of the trunk at the epigastric, umbilical and hypogastric regions yielded 50, 51 and 51½ inches respectively. From that date, January 10th to February 10th proximo, there was an increase of one-fourth of an inch for the first, half an inch for the second, and half an inch for the third region (adhering to the order in which they were first named).

On March 16th, thirty-five days after second and forty-nine after first measurements, there was a decrease of four and one-quarter inches for the epigastric, four and one-half for the umbilical and five for the hypogastric regions. Amelioration of every symptom was marked. Patient took more food, with less discomfort; slept better; was comparatively free from pain; menorrhagia was less pronounced; was able to take a moderate amount of outdoor exercise, and, excepting occasional hysterical paroxysms, has made uninterrupted progress.

April 1st, sixteen days since tape-line was last applied, shows a loss of four inches for the first, four for the second, and three for the third region, and patient much improved in every respect.

May 21st, fifty days, reveals a decline of ten inches for the first, nine for the second, and eight for the third region. With the exception of a few small abscesses, resulting from hypodermic medication, patient expresses herself as feeling "quite well."

July 11th, fifty-one days, discloses a falling off of five and one-half inches for the first, four and one-half for the second, and four and three-quarters for the third region. Patient feels so well that she enters upon a general round of visiting, returning calls made while she was confined to her room. On the 6th of October she resumed her occupation of teacher in the public schools in this city, and has only lost one day, and that on account of sore throat.

December 23d, ten months and twenty-seven days after my first treatment, measurements displayed a circumference of 24 inches against 50¼ for the epigastric, 30 against 51½ for the umbilical, and 30 instead of 52 for the hypogastric regions, exhibiting a difference of 26¼, 21½ and 22 inches respectively. As far as could be ascertained, every function of her economy was normal, including menstruation. Mensurations taken to-day, April 18th, gave a still further slight decrement.

The treatment of this patient can be briefly stated. Ergot hypodermically was the only directly curative agent employed, but it was carried far beyond the limit advised by Hildebrandt and others. I began with the daily use of the stereotyped dose of three grains of Squibb's solid extract, diluted with a little glycerine and warm water, and so continued it for ten days, when my patient's increasing distress seemed to justify the administration of a like quantity morning and evening. From the eleventh day I increased the dose one grain each day until ten grains were given morning and night. Slight signs of ergotism appearing, I did not increase the quantity further, but continued it in that degree until April 1st (fifty-four days), when its evening exhibition was omitted. Ten grains daily at a single dose was maintained until May 21st (fifty-one days), when the great shrinkage of the tumors, and disappearance of painful symptoms, led me to extend the interval to every other day. This latter order was pursued until July 11th (fifty-one days), from which date to December 23d the quantity employed was reduced to five grains, and the interval increased to three days. As previously stated, Squibb's solid extract was the preparation selected, and the quantity used was freshly diluted with warm water at the time of using it. Less irritation was produced by fresh aqueous solutions than by others, however compounded, when allowed to stand a few days. The points of puncture were not restricted to any particular region, but a considerable extent of the surfaces of the trunk, upper and lower extremities were utilized, first and last. The needle was variously introduced—obliquely into the subcutaneous areolar tissue, and straight down into the muscular structure—without appreciable difference in result as regards local irritation. Occasional abscesses developed in spite of every precaution.

None of the distressing symptoms of ergotism manifested themselves during the progress of the treatment. No gangrenous tendencies, no spasmodic complications; neither were there troublesome headache or vertigo. Nervous phenomena and nausea were the only symptoms which could be attributed to ergot. Hysterical paroxysms, however, have annoyed her from the beginning of her illness, and were no doubt in large measure due to exhaustion and reflex disturbance. The most notable effect of the ergot was slowing of the cardiac rhythm. The supplementary treatment consisted of blood, nerve and digestive tonics, rigid attention to all the functions, carefully selected diet, well-regulated personal and house hygiene, and anodynes and hypnotics when indicated. I improvised an abdominal supporter, which the patient wore when she sat up or walked, and it afforded great relief to the pelvic viscera.

The patient visited the Exposition at New Orleans in the former part of January, during a very cold spell, and the combined influence of fatigue and chilliness gave a fresh impetus to the tumors, but within a month, under the same line of treatment already detailed, they had degenerated into insignificant, hardish masses. Five grains every four days is still employed. It cannot be urged that the rapid retrogression of these tumors is anywise the result of senile involution connected with the climacteric, for the patient had never suffered the slightest aberration of the menstrual function until menorrhagia was excited by these abnormal growths.

42. Prof. JOSEPH EASTMAN, M. D., Indianapolis, Ind., reports :—

CASE I.—I was consulted, February 22d, 1878, by Mrs. D., aged forty-three, widow, one child, aged twenty years. Her appearance was that of a lady in declining health,

somewhat emaciated, and very anæmic. She stated that about three years before she began to lose too much blood at her menstrual periods, and from that time forward, with an occasional temporary improvement, the flow had become more and more free, until at times it was alarming.

For the past two years she had noticed an enlargement of her abdomen, at first scarcely perceptible above the pubes, but at the time of my examination it extended three inches above the umbilicus, and broad enough to rest upon the brim of the pelvis; on examination I could pass the flexible sound some nine inches into the uterine cavity. I decided the tumor to be insterstitial fibroid, located in the posterior wall of the uterus. The counsel of Dr. Parvin was had, confirming the diagnosis. I at once began the hypodermic use of ergotine, dissolved in distilled water, using five grains to the drachm, and injecting with very fine needle at least one grain at each time, plunging the needle as deeply into the tissues of the abdomen as I could without wounding the peritoneum; intense pain followed each injection, lasting from one to two hours. Still the patient submitted to the treatment daily, from February 22d to March 20th, making twenty-seven successive injections. By this time there was no point over the abdomen that was not tender from the repeated punctures, although no evidence of abscess was present. As she was much prostrated, from pain, I permitted her to visit a sister in an adjoining county, and desiring to keep the tumor reduced (it being already perceptibly less), I prescribed Squibb's Fluid Extract of Ergot in half-teaspoonful doses, to be taken every four hours, beginning five days after the menstrual flow ceased, and continued until the pains became more than she could bear. She followed the direction, but found no pain following its use for forty-eight hours, when it produced the most intense pain, necessitating the calling of a physician, who watched by her bedside nearly all night, using morphine hypodermically, hot fomentations to abdomen, etc. I was telegraphed for in the morning, and found her condition truly alarming, from what we considered an accumulative effect of ergot. She rallied, and although we were delayed in the internal use of ergot, we succeeded in using fifteen more hypodermic injections of ergotine during the months of April and May. At the menstural period in April the blood was very black, and gave odor of decomposed blood.

The last of May she returned home (this time taking no vial of ergot), returning August 18th; from that time to October 18th, omitting the time of menstrual periods, I gave forty hypodermic injections of the ergotine, each one producing pains, though they were not so intense as at the beginning. By this time the tumor could no longer be felt without some effort, above the pubes; the sound passed three inches into the uterine cavity.

I kept watch of the case for two years, when she informed me of matrimonial prospects. I hear from her brother that her health remains good up to this time. I report this case, not that I am of the opinion that ergot will succeed in every case, as in the next case it did no good at all, but to show the good effects of the hypodermic injections of it in this case, and the bad effects of its internal administration, and the, to me, wonderful toleration of the tissues in admitting of eighty-two injections in the space of eight months, without the formation of an abscess, which I attribute, 1st, to the delicacy of the needle employed; 2d, the depth to which it was plunged; and 3d, the caution in having the solution filtered.

43. Case II.—Mrs. H., German by birth, aged forty-two, married, mother of eleven children, one miscarriage, consulted me July 13th, 1879. Her general appearance was that of a lady anæmic from loss of blood. On inquiry I learned that she suffered from both menorrhagia and metrorrhagia, the former to an alarming extent, at her last period. I made a digital examination and found the uterus enlarged, extending upward to within two inches of the umbilicus. I introduced the speculum and passed

the flexible sound eight inches into the uterine cavity. It first inclined forward, then backward. Uterine tenesmus not well defined. There was no vesical or rectal irritation. I diagnosed submucous fibroid tumor attached by at least two-thirds of its circumference to the fundus and posterior uterine wall. At the next monthly flow I took the opportunity to pass the finger within the uterine neck and explored the tumor carefully. Let me here remark that one who has not searched with the finger for an intra-uterine growth during the menstrual period, can hardiy appreciate the facility with which it can be done.

The hemorrhage from the lower surface of the tumor was very free. After keeping her in bed until the menstrual period had passed, using such antiphlogistic remedies as cloths wrung out of cold water, cold drinks, etc., I dilated the os and applied Churchill's tincture of iodine freely to the lower surface of the tumor. It seemed to check the bleeding for a time, and nearly three weeks elapsed before there was any return. During the interval, however, I used one hypodermic injection of ergotine. It did not produce the desired uterine tenesmus, but violent pains, extending over the entire abdomen. I then gave a teaspoonful Squibb's ergot internally. It acted somewhat different in this, that it produced no pain at all. I used the hypodermic injections of ergotine on two occasions afterward, between the menstrual periods, the last time its use being followed by such alarming symptoms as to compel the abandonment of it altogether. During the months of January and February her hemorrhages were so profuse as to show large pools of blood on the floor beneath the bed.

I proposed the removal of the tumor, and found patient and friends willing to consent to anything for relief. On the 18th of March, after having fully dilated the cervix with large sponge tents, Dr. Herr brought the patient fully under the influence of ether, and I introduced the Sims speculum, dragged down the uterus with vulsella forceps, and, assisted by Drs. Parvin and L. L. Todd, I proceeded to remove the tumor.

I began enucleation with "Thomas's Spoon saw," and after some thirty minutes sweeping the saw around the base of the tumor (guiding its movements by my finger), the growth was dragged from the uterus and vulva. The hemorrhage was not alarming. The uterus was filled with cotton, saturated in a solution of Churchill's tincture of iodine. The temperature rose one degree on the second day, gradually declined, and by the fifth day was normal. The pulse never reached above 100 during any of the time. At the end of forty-eight hours the cotton was removed from the wound and the cavity washed with a strong solution of carbolic acid, one-tenth, and this repeated daily until there was only a slight discharge of healthy pus. Uterine cavity measured three inches. At the end of one month she resumed her labors at the wash tub, by which means she contributes to the support of her family. The tumor weighed two and a half pounds, and proved to be fibrous in structure.

44. N. UDELL, M.D., Concordia, Kansas, reports:—

Mrs. K. B., about 50 years old, having several children, had a fibroid about fourteen years since, which was treated with fluid extract of rye ergot, by the mouth, 1 drachm three times a day. Tumor commenced decreasing soon after using, and has now disappeared, leaving the patient in good health.

45. E. J. BEALE, M.D., Fort Worth, Texas, reports:—

Miss S. L., aged 40 years; puberty at 14 years. Menses regular, abnormally free, with no pain. Leucorrhœa slight. Tumor appeared some six years ago, weighing thirty to forty pounds. Commenced using fluid extract of ergot two years ago, by the mouth and hypodermically. Dose one-half drachm hypodermically, and one drachm by mouth twice a day, for three months. Bad effects were, sacral abscesses. It was

thought the hemorrhage was increased by use of ergot, but there was a diminution of the size of tumor, of an inch or two. Tumor is now stationary.

46. RICHARD H. DAY, M.D., of Baton Rouge, La., reports:—

S. K., aged at death 71 years; married at eighteen years. Two children, one of whom living, aged 56 years. Thought to have had a miscarriage between 1836 and 1850. An octoroon; occupation housekeeper. Menstruation began to be profuse in 1850, when the tumor first appeared. Vaginal examination found the os partially open, canal short and uterus low; also on the anterior wall of the uterus found a hard substance as large as a fœtal head at term, which I diagnosed a submucous or interstitial fibroid tumor. Then began using wine of ergot, in doses of one teaspoonful three or four times a day, until violent expulsive pains were produced, which invariably resulted after the continued use of ergot for five or six days; consequently its use was discontinued for a time, then resumed, with like consequences. After close of war, in 1865, again seeing patient, ascertained she had continued the use of ergot till she experienced that she was better; hemorrhage had ceased, with a marked diminution of size of tumor. Close examination revealed a hardness in the former site of the tumor, but no tumor could be detected.

47. HAL. C. WYMAN, M.D., of 46 Adams Ave., West Detroit, Mich., reports:—

Mrs. W., aged 41 years; puberty at 12 years; married at 20 years. No children. Menstruation regular; very profuse since five years ago. Leucorrhœa pale, slight, not constant. Tumor first noticed seven years ago to be eight inches in size. Commenced the use of fluid extract of ergot by the mouth, in doses of fifteen minims, three hours apart, increased to half a drachm. Large doses occasioned some headache. During the year 1886 ergot had ceased to have any control of hemorrhage, and as tumor had begun to grow rapidly, thought best to remove it. In June, laparotomy showed the tumor to be immovably wedged in pelvis and could not be removed by any process with safety to patient. Thought to enucleate it, and explored its interior at two points with a long trocar, but found the hemorrhage so great that enucleation was out of the question, and had to treat the punctures with cautery. The arteries and veins on one side only were ligated, for on the other side the veins were too feeble to stand a ligature. The tumor decreased rapidly after operation, so much so that two weeks after, when the abdominal wound had closed, the tumor was hard to find. The death of patient three weeks after was due to erysipelas, which originated in a place where a hypodermic injection of brandy had been made into the thigh to revive her from effects of hemorrhage caused by operation.

48. LEWIS L. MCARTHUR, 96 State street, Chicago, Ill., reports:—

Mrs. H., aged about thirty-one years. Married at twenty-five years. No children. Menstruation regular but too frequent; marked pain; profuse since age of twenty-eight and one-half years. The tumor first manifested itself at that time. Dr. Wm. H. Byford measured and gave his opinion as to size, that it was two to two and one-half inches in diameter. Solid Extract of Rye Ergot used by the mouth, half a grain twice a day, increased to three-quarters of a grain, after the second week, three times a day. It was continued for three weeks and reduced to former dose. Bad effects being, diarrhœa, controlled by small amounts of opiates. Ergot was used until the seventh week, when a purulent discharge occurred, abscess opening into cervical canal or uterine cavity. Quantity roughly described by patient, being at a distance, as a teacupful. At last reports, a year after treatment, in "better health than for years.

49. Prof. CHAS. T. PARKES, M.D., Chicago, Ill., reports:—*

CASE I.—Mrs. S., American; forty-three years old; widow; three children. No

* Reported in *Chicago Medical Journal and Examiner*, August, 1886.

miscarriages. Menstruated first when sixteen years old. Never had any noticeable trouble with menstruation until three years previous to my first examination. During these years she had suffered with irregular, profuse hemorrhages, which were now continuous, accompanied with exacerbations on the slightest exertion. My first examination was made February 20th, 1876. As my memory brings this patient before me, she presented the most perfect example of transparent flesh that I had ever seen. A large, finely-formed woman, her flesh looked like alabaster, apparently destitute of blood. The legs were œdematous, the heart beat feeble and rapid, and the slighest exertion was followed by extreme palpitation and the most fearful feelings of suffocation. Her answer as to what she had done for her trouble was that she had taken "quarts of medicine." Vaginal examination revealed an enlarged uterus and patulous os, from which blood was rather freely oozing. The sound entered the uterus about five inches, the handle being deviated forward and to the left side. A diagnosis of submucous uterine fibroid was made.

The treatment adopted was the administration of strychnia and iron, together with wine and good diet for the general condition, and one-half drachm doses of Squibb's fluid extract of ergot every six hours, to either expel or kill the growth. Locally, to stay the hemorrhage, a small tampon of pulverized alum was applied to the os uteri and held in position by ordinary cotton tampons.

The first forty-eight hours' use of the ergot produced quite severe uterine pains, so acute that the patient, in her weakened condition, said they were unbearable. At this visit Prof. T. D. Fitch was with me in consultation. The tampon of alum was removed, and Dr. Fitch's examination confirmed the diagnosis made, and he advised the continuation of the treatment. As the bleeding had been entirely controlled by the tampon, it was left out. The ergot was continued as before, and a sufficient dosage of morphine ordered to make the pains bearable if they persisted. No further use of the tampon was required; the uterine contractions never ceased while the ergot was administered. On the sixth day of its use a foul-smelling serous discharge came on, per vaginam, accompanied with slight general chilliness and a temperature of 102° F.

The patient was assured that the tumor was surely coming away, and encouraged to bear "yet awhile" with her great suffering. On the eighth day the tumor was found in the vagina and removed. It was about the size of a duck's egg, and very hard to the touch. After a short period of mild septic trouble the patient passed through a quick convalescence, and rapidly recovered. Seen a few months ago, she says she has never had any illness since getting rid of this growth, and certainly looks well.

50. Case II.—Mrs. P., German; married; five children; no miscarriages. Menstruation began at fourteen. Now thirty-seven years old. Seen by myself first in March, 1881. The patient is a robust, hearty woman. Never had any trouble until six months after the birth of last child, about one year ago, when she began to flow too freely and too often—as often as every week, or, occasionally, twice a week. The blood was in large quantity and bright red in color.

The examination revealed an enlarged uterus. It could be felt above the pubes during bimanual examination. The sound entered easily for five inches, the handle deviating forward and to the left. Its use was accompanied and followed by very free bleeding.

*Diagnosis.*—Submucous uterine fibroid on anterior wall.

*Treatment.*—Locally, the alum tampon was used as in the previous case. Squibb's fluid extract of ergot, in half-drachm doses, every six hours. The patient was ordered to remain in bed. On the succeeding day all the tampon, except the alum, was removed. No hemorrhage; slight pains complained of. On the second day the pains were very severe, and morphine was given to control them. The alum tampon was

removed, and a carbolized hot water injection ordered three times a day. On the third day pains still severe, and a foul-smelling vaginal discharge commencing.

The condition persisted until during the night of the eighth day, when I was summoned to the patient on account of the unusual severity of her sufferings, the messenger, her husband, saying it was just as if she were having a baby. On my arrival the pains had quite ceased. Examination showed the loss of considerable blood, and the vagina was found filled with a large fleshy mass, horribly offensive. The finger could be passed beyond it, and the largely opened cervix recognized. It was seized with a volsellum forceps, twisted a few times upon itself, and then delivered. The mass was as large as a closed fist, dark-colored, and ragged all over its surface and very foul smelling. The patient regained her usual health, and is well to-day.

51. Case III.—Mrs. E., thirty-three years old; married; three children living; one miscarriage. Menstruation commenced when fourteen years of age. Was first called to visit her January 2d, 1885, for severe uterine hemorrhage. She then informed me that she never had any trouble with menstruation until about two years previous. Shortly thereafter she was operated upon for laceration of the cervix, without much relief to her trouble; since she had gradually grown worse, so that she was not free from bleeding ten days in the month.

One year previous to my seeing her the uterus was freely curetted and fuming nitric acid applied to the cavity, as a relief for the bleeding. The procedure failed in any good result.

At this visit the bleeding was extreme in degree. Examination revealed the pelvis largely filled with a smooth, doughy mass. After considerable searching the os uteri was found high up above and close to the pubes. It could only be found by crowding the finger between the bone and the growth. The growth was exquisitely tender to the touch or any manipulation. Bimanual palpation discovered an uncertain mass above the pubes. The vagina was tamponed temporarily, and morphine administered hypodermically. The diagnosis was reserved. In my mind it rested between hæmatocele and soft myoma. The tumor was compressible; at least its elements seemed to give way to the pressure of the finger. It was semi-elastic and painful under manipulation, filled the entire posterior half of the pelvis, and the os was carried well upward and forward. It might be, and probably was, a myoma of the posterior uterine wall retroverted.

The patient was put upon fluid extract of ergot in one-half drachm doses three times a day. The next menstrual period showed no change other than a diminished loss of blood. In June the flooding was quite free and accompanied with considerable pain. In July everything was as bad as possible, with so much pain that the ergot was discontinued. Repeated examination now narrowed the diagnosis down to soft myoma. The removal of the uterine appendages was suggested, in the hope that this procedure would anticipate the menopause, stop the bleeding, and lead to the gradual atrophy of the growth. In September consultation was solicited with Prof. W. H. Byford, when the patient was etherized and carefully examined. The sound, introduced with great difficulty, owing to the displaced position of the os, passed in over five inches, positively demonstrating the nature of the growth, its consistency showing it to be the soft variety of myoma.

As the patient could not be said to be in absolute danger of her life, the operation was refused by her friends, although the sufferer was willing enough to have it done.

The previous treatment was endorsed by Prof. Byford, and its continuance advised. The fluid extract of ergot was resumed and rendered bearable by morphine.

The October illness was accompanied by slight hemorrhage, but excessive pain. These uterine contractions continued on, after the menstruation ceased, until, during the last week of October, they became labor-like in character. Examination now

revealed that the uterus had righted itself, the os was becoming patulous and its edges thinned out; through its opening the projecting tumor could be felt. On the second day of November pieces of the broken-down mass, horribly offensive, could be seized with the forceps, pulled out of the uterus, and cut away.

Chilly sensations began to be felt by the patient, sweating came on, the temperature ran up to 101° F., and a mild septicæmia was established. During the following week the pains never ceased. Quinia was administered freely. The patient was very much reduced physically, but rapidly convalesced, and is now perfectly well, with her menstruation normally established. Fully a quart of soft pultaceous pieces of the growth were removed.

52. CASE IV.—Mrs. L., German; thirty-four years old; one child; was seen first November, 1885. She had been suffering with increased menstrual flow for a year. She came to me to be treated for an external, painful, labial swelling. It proved to be a vulvo-vaginal abscess. It was opened freely, and gave no further trouble. A uterine tumor was noticed and examined. It was found to be of considerable size; could be detected above the pubes.

She was put upon one-half drachm doses of fluid extract of ergot every six hours. This she continued for six months steadily, with varying conditions of pain and hemorrhage, until, in April, 1886, the hemorrhage ceased, pain became very severe, and a shreddy, foul-smelling discharge manifested itself. She was removed to the St. Joseph's Hospital, and after ten days of antiseptic washings and removal of masses of broken-down tissue, the mass was entirely extruded. This patient had also quite a septicæmia, but finally recovered and is now well.

53. J. SCHNECK, M. D., Mount Carmel, Ill., reports:—

CASE I.—A healthy woman; had three children without any unusual symptoms. But several months after third accouchement began to have serious uterine hemorrhages. On examination found fibroid tumor in posterior wall of womb; intra-mural; outlines not well defined. Gave one-half drachm doses of fluid extract of ergot freely until the alarming symptoms had subsided, then gave it three times a day in same dose, intermitting it at times, for nearly eighteen months, when she became pregnant the fourth time. Passed through full term without any trouble, except slight hemorrhage the first month, controlled by ergot. Labor natural, but followed by threatening hemorrhage. In four hours found her dead, suddenly, without any perceptible hemorrhage.

54. CASE II.—A lady, aged fifty years; otherwise good health. Examination showed a tumor on posterior wall of womb, nearly size of a goose egg. It had tilted the womb backward till the os was high up under the pubes. The tumor and posterior wall of the womb had dropped through the vagina, and were constantly dangling between the limbs, causing great annoyance. It had been so for more than ten years. Used hypodermic injections of fluid extract of ergot once a week for two months, when the tumor suppurated and was entirely discharged. Then replaced the womb and held it with Hodge's pessary. After several months ceased to wear pessary. For three years no inconvenience.

55. C. U. COOPER, M. D., Cleveland, Tennessee, reports:—

Mrs. C., aged fifty-five, having two children, aged twenty-three and twenty-one years respectively. Menstruation regular, not profuse, slight pain. Leucorrhœa free at all times. Menses began to be profuse in 1884. Leucorrhœa in 1880. Tumor noticed in 1879, with an estimated diameter of six inches. Began fluid extract of ergot in November, 1884, by the mouth, in doses of eight to ten minims, four times a day, continuing until February, 1885, when she stopped, the tumor having perceptibly diminished in size. In September, 1885, it began to enlarge until it was larger than at first. After resuming the ergot, in November, 1885, it again diminished in size. In January,

1886, again stopped the ergot, and since then there has been no perceptible increase in size of the tumor, and menses have ceased.

56. R. B. Bontecou, M. D., of Troy, N. Y., reports :—

Case I.—Mrs. B. H. G., aged thirty-seven years ; puberty at thirteen years ; married at twenty-four. One child, eleven years old. Menstruation always regular until tumor appeared; never much pain. Leucorrhœa yellowish, never profuse nor constant. Tumor appeared about three years ago, very small, subperitoneal, anterior aspect and sessile. Used solid extract of ergot in three-grain pills three times a day ; also fluid extract, twenty minims, three times daily. Fluid extract disturbed digestion and produced nausea. Good effects noticed one month after beginning use ; no inconvenience whatever now.

57. Case II.—C. G., aged twenty-seven years ; puberty at fourteen years ; single. Menses always regular ; trifling pain until began profuse in February, 1887, when the tumors first appeared, one about three inches, two others two inches each in diameter. Commenced the use of fluid extract of ergot by the mouth, in doses of twenty, increased to thirty minims, three times a day. Colic pains slightly felt on first using the drug. Tumors were subperitoneal, quite movable about the abdomen, simulating ovarian cyst. In May the enlargement ceased, in June sensibly diminished.

58. Case III.—Mrs. E. M. G., aged thirty years ; puberty at fourteen years ; married at twenty-one years. One child, six years old. Menses generally regular, no pain, never profuse. Leucorrhœa mucous, not constant. Tumor appeared in January, 1884, size of an ordinary hen's egg, situated in anterior aspect of uterine fundus. Used fluid and solid extract of ergot, twenty minims, three times daily, producing some nausea. Much diminution in size began in three months.

59. Daniel Lichty, M. D., of Rockford, Ill., reports :—

Mrs. W., aged forty-three years at death. Married, but widow for fourteen years. Two children, aged twenty-one and eighteen years respectively. Menstruation regular, profuse, after appearance of tumor painful. Slight leucorrhœa, not constant. Tumor gave to the abdomen the appearance of pregnancy at five months. Three months prior to the removal of the tumor commenced the use of an aqueous extract of ergot, made from Squibb's solid, with promptest effect hypodermically; also good effect via suppositories by the rectum, in three-grain doses. The tumor was expelled from uterus into vagina after using ergot about three weeks, from which it was removed by abscission and enucleation. No unpleasant symptoms followed until the eighth day, when embolism occurred as she raised in bed to partake of some food brought her. She fell back unconscious, remained so for five days, when she died. The tumor was submucous, measuring about five cm. in circumference ; was densely fibrous; removed in portions, on account of its size.

60. A. R. Smart, M. D., Toledo, Ohio, reports :—

Mrs. E. B., aged forty-three years; puberty at fifteen years; has three children, aged twenty-four, sixteen and thirteen, respectively. Menstruation regular about half the time until seven years ago, when for a time it was profuse; no pain. The tumor was noticed about seven years ago, about the size of a hen's egg ; symptoms lasting for a few months, when there was a large amount of fleshy substance looking like "chopped liver" expelled. The disease then remained latent for two years. Four years ago more active phenomena commenced; tumor size of a teacup. About two years ago, when I was first called, tumor the size of a quart bowl; very hard. Hemorrhage nearly constant. Parke, Davis & Co.'s normal liquid ergot used hypodermically, ten drops twice a day, increased gradually up to twenty minims, continued three months. No bad effects except local abscesses. Mass expelled. Since then every two or three

months pieces of fleshy substance are expelled. Present health better than has been in five years. Still using ergot.

61. E. S. RICHARDSON, M. D., Reed City, Mich., reports :—

Mrs. B., aged fifty-six years; puberty at fourteen years; married at fifteen years; had ten children, ages from forty to fourteen years. Menstruation regular ; profuse for twelve years; not much pain. Tumor first noticed nine years ago; five inches in diameter when removed. Used ergot, Squibb's fluid extract, by the mouth, in doses of ten to fifteen minims every two or three hours, according to hemorrhage. One year after it presented at os uteri ; administered chloroform and removed tumor by torsion. December 22d, 1886, patient says no signs of return.

62. A. H. SHROFFER, M. D., Nantasket, Mass., reports :—

Mrs. S., aged fifty years; married; having six children. Menstruation regular until age of forty-four years, when tumor began to make itself known. Two years later, when I saw it, it was the size of a fœtal head. In January, 1882, commenced the use of fluid extract of ergot by the mouth, an average dose of fifteen minims; also took chloride of ammonium. Hemorrhage controlled soon; case entirely recovered.

63. JAS. TABER JOHNSON, M. D., Washington, D. C., reports :—

CASE I.—Miss A. M., aged thirty years; single. Menstruation regular ; rather profuse since twenty-eight years old; some pain. Leucorrhœa not much. Tumor first noticed about this time; size of an adult head. Squibb's fluid extract of ergot was used hypodermically for six months. From the very first stopped hemorrhage and other bad symptoms. Tumor decreased about half. Patient now comfortable and happy.

64. CASE II.—A woman, about forty years, came from Florida for an operation. Fibroid, about the size of my fist, in vagina, and larger than my head in the abdomen, shaped like an hour-glass. Declining to make an hysterectomy, as there was no proper pedicle to be secured, recommended hypodermic injections into abdominal wall of Squibb's fluid extract of ergot. This was done for weeks; at first no good results; patient in bed from hemorrhage. Then this hemorrhage was stopped, pains coming on, and tumor lessened much in size and patient able to walk about, fully one-third smaller, and she is greatly encouraged.

65. CASE III.—Tumor, estimated by several physicians to weigh forty pounds. Ergot given by mouth did her much good. Now stopped, but was much more comfortable and tumor diminished in size. Is now using electricity.

66. MARY H. THOMPSON, M.D., 638 North Jackson St., Chicago, reports :—

A woman, about thirty-five years of age, had three subperitoneal fibroid tumors of the uterus; one sessile, one on a pedicle of two or more inches, and third on a pedicle so long that the tumor would float to any part of the abdomen. Ergot, Fluid Extract, was used in twenty minim, increased to thirty minim doses for several weeks. The tumors were soon found so closely bound to the womb that no one examining them for the first time could learn of their pedicles. Then stopped the ergot suddenly and found the floating tumor perfectly free for the first time, a week after the withdrawal of the drug.

67. JAMES W. LEADENHAM, M.D., Franklin, Pa., reports :—

Mrs. B., about thirty-eight years of age. Married at twenty-three years. No children. Menstruation regular, but very profuse since 1882, with slight pain. Leucorrhœa thin, but copious and constant since 1882. Tumor discovered in the early part of 1883, with a diameter of probably seven and one-half inches. Commenced the use of Squibb's Fluid Extract of Ergot, principally by the mouth, also hypodermically, twenty minims, increased to forty minims three times a day. Continued medicine till six

months ago. None but temporary bad effects. The patient has been in perfect health for almost a year, and the tumor has diminished to quite small dimensions and gives no trouble.

68. W. G. DWYER, M.D., Independence, Iowa, reports :—*

Miss M. M., aged thirty, domestic. Puberty at fourteen years. Single. Menstruation regular, no pain; for one year quantity doubled. Nine months ago tumor was first discovered. Commenced, in Jan., 1886, the use of Fluid Extract of Ergot, by mouth, in doses of one teaspoonful, three times a day, for one week, then decreased to fifteen minims three times a day, on account of pain. The tumor was expelled and absorbed, and the uterus normal in depth and size in six weeks from the time first dose was given.

In April, 1886, patient married and moved into the country; did not see her again until March, 1887, when she returned with tumor as large as ever. Gave ergot as before, and in one teaspoonful doses, with rather unsatisfactory results. Tumor is still over half as large as it was when she came to me, over three months ago, though ergot is taken continually. At first the ergot diminished the size of tumor, and I was able to take away two pieces with my finger, from the inside of the uterus, as large as a fig. Ergot now, in increased doses, does not cause any diminution of the size of the growth.

69 P. DRAYER, M.D., Hartford City, Ind., reports :—

CASE I.—Mrs. H. S., housewife, aged thirty-six years. Puberty at fourteen years. Married at twenty-three years. Had five children, aged sixteen, thirteen, ten, eight and six years respectively. Had two miscarriages. Menstruation regular, but excessive, with pain. Leucorrhœa excessive and constant. Menstruation began to be profuse at thirty-three years of age. Leucorrhœa at thirty-two years. Tumor noticed about three months after; estimated diameter five inches. Commenced the use of Squibb's Fluid Extract of Ergot, by the mouth, in doses of from fifteen to thirty minims, three times a day. In about eighteen months the tumor was forced from the uterus and was removed, patient making a good recovery.

70. CASE II.—Mrs. D. S., aged forty-four. Puberty at sixteen years. Married at twenty-two years. Has two children, aged respectively eighteen and fifteen years. Had two miscarriages. Menstruation excessive, since tumor began, with pain. Excessive and constant leucorrhœa. Menstruation and leucorrhœa began to be profuse about the age of thirty-four years. In six months tumor appeared about six inches diameter. About two years since Fluid Extract of Ergot was commenced and used in doses of fifteen to thirty minims. The ergot controls the excessive hemorrhage, and the woman is able to attend to her household duties most of the time.

71. J. A. WESSINGER, M.D., Howell, Michigan, reports :—†

CASE I.—Mrs. M. M., aged 35 years; puberty at 14 years; married at 20 years. Sterile. Menstruation never regular; small in amount; some pain. Menses began to be profuse at thirty years of age. Tumor appeared five years ago. Commenced the use of fluid extract of ergot by the mouth, in doses of one drachm, twice a day, increased to eight drachms in a day. Severe headache followed, when the drug would be discontinued for a time, to be resumed. After one year the tumor began to diminish in size, and has now decreased one-half in size since commencement of treatment.

72. CASE II.—Mrs. L. B., aged 28 years; puberty at 13 years; married at 20 years. Has five children, aged seven, six, four, three and two years respectively. Menstruation regular, rather profuse; quite marked pain. Leucorrhœa yellowish, watery, profuse, not constant. Menses began to be profuse in 1882, leucorrhœa in 1884; tumor first noticed in 1886, size two and a half inches in diameter. Commenced use of ergotine three

* Reported to the Buchanan County Medical Society, Independence, Iowa.

† Reported in *Medical Age*, Vol. IV, page 219.

grain pills, January, 1886, giving three pills every hour for seven hours. Headache, blindness and giddiness began after the fourth dose. Tumors (being multiple fibroids), three in number, were expelled during the seventh hour.

73. H. CUSHMAN, M.D., of Blair, Nebraska, reports :—

Mrs. L. D. W., aged 43 years; puberty at 13 years; married at 15 years; has four children, ages twenty-two, nineteen and ten years; one dead. Ten miscarriages in fifteen years, probably criminal. Menstruation usually regular until eight months ago; amount large and painful. Leucorrhœa all her life, nearly. Began to be profuse eight months ago, sanious, bad smelling. Tumor made its appearance six months ago, and was about the size of a pregnant uterus at five months. At this time commenced the use of fluid extract of ergot by the mouth, in doses of one-quarter oz., four times a day, for about two months, when patient discontinued its use. Tumor had decreased in two months fully one-half, but since that time, as patient has discontinued the use of the ergot, it has grown and is as large as ever.

74. C. P. FENN, M.D., 3030 Michigan Ave., Chicago, reports :—

Miss K. W. B.; teacher and general canvassing during illness; aged 51 years; single; puberty at about 16 years. Menses quite regular, small at first, increasing, some fifteen years ago, gradually to a hemorrhage. Leucorrhœa thick at first, but with increasing amount, watery; continuous for about seven years. Tumor first noticed about fifteen years ago, but not considered such for some time; probable weight thirty pounds. June, 1878, commenced the use of solid ergot and pill form of ergotine by the mouth, in doses of three grains, three times daily, for five months, producing irritation of bladder. Shape of tumor changed soon after the beginning of the ergotine, flattened and extended over greater space, occasioning suspicions of rapid growth; next becoming symmetrical, and on increasing use of ergotine suspension of menses and rapid recuperation. On return of menses recommenced use of ergotine; same effects. Never succeeded in using ergot in fluid extract, for it occasioned vomiting, and once an overdose brought on a stopping of the heart. The tumor began settling away from vital parts to lower part of abdomen, size decreasing from its upper side. July, 1887, menses ceasing, coming only at irregular intervals.

75. W. O. B. WINGATE, M. D., 200 Juneau Avenue, Milwaukee, Wis., reports :—

Mrs. G. W., aged thirty-nine years when treated; puberty at sixteen years. Married about twenty-one years. No children. Menstruation regular; excessive; much pain. Leucorrhœa varied, often excessive, quite constant. Tumor was located in the posterior wall of uterus, estimated size of a small orange. Complications existed; the uterus being retroflexed and bound down tightly to the rectum by repeated inflammation. She was a victim of the opium habit, and hemorrhages were alarming. Used Schieffelin pill ergotine, thirty grains, three pills a day for ten days, then omitted for a time, then began again. Some pain caused, so that ergot was omitted for a time. After taking about one hundred pills, the tumor, which had undergone calcareous degeneration, was expelled. The mass expelled was about the size of a large thumb. No hemorrhage of any amount since, although she has had several attacks of pelvic inflammation. Seven years have elapsed. She has passed menopause, is cured of the opium habit, and remains much more comfortable than before taking ergot.

76. R. THOMSON, M. D., No. 1 Cypress Street, Troy, N. Y., reports :—

Mrs. S. P. A., aged thirty-eight years; has one child, nineteen years old. Menses never seemed to be much increased in quantity or frequency. Leucorrhœa was not marked. Tumor first noticed September, 1886, and fluid extract of ergot given, in one-half drachm doses three times a day by the mouth, occasionally changed to rectum. A month later also gave belladonna, to relieve the reflex pains. At the beginning of

treatment the uterus extended about half way from pubes to navel, and at close of treatment, end of March, the tumor felt the size of a large horse-chestnut excrescence on the right anterior surface of uterus, which was three inches in depth.

77. J. WILLIS HOUSTON, M. D., Oxford, Pa., reports:—

Mrs. J. C.; farmer's wife; aged thirty-two years; puberty at sixteen years; married at twenty-five years; has four children, aged eight, six and two and one-half years; one, aged four years, dead. Menstruation regular, no pain. Leucorrhœa profuse since last September. Tumors were noticed at that time. Fluid extract of ergot began to be given in February, mouth principally, also by rectum and vagina, hypodermically, in doses of five to fifteen minims three times a day, until September 1st, after which one drachm daily until December 1st. There were two fibro-cystic tumors in womb, on each side, of nearly equal size, five and one-half to seven inches, submucous. December 3d some of the cysts gave way, and six or eight ounces of fluid passed from the uterus, first evidence of contraction of the womb, which had then reached umbilicus. The stomach becoming irritated, ergot was stopped. On the 5th of December evidences of septicæmia developed. The right parotid became involved, and suppuration of that gland ensued, which, strange to say, discharged through the duct of Steno; no artificial opening required. The blood poisoning depressed her very much, but January 1st was able to sit up in bed. January 1st made a thorough examination of the tumors and dilated the uterine os. The neck of the uterus was dilated, and only a small band of circular fibres at external os was resisting the escape of one of the tumors. Twelve hours after examination was called, on account of hemorrhage, and found the tumor protruding through the os, and the latter dilated fully three inches in diameter. By traction I succeeded in removing the tumor piecemeal after severing the pedicle, then attenuated to size of finger. Introduced a tampon of marine lint and prepared cotton, unwilling to attempt more at this time; pulse 140. Had given two ounces of whiskey within thirty minutes. On the morning of the third, assisted by Dr. Rea, removed the tampon, and succeeded in the removal of the second tumor, estimated weight of both being five pounds. She is now, 12th of January, giving every evidence of speedy recovery.

78. ADOLPH KESSLER, M. D., N. Y., reports:—*

Mrs. ——, a tall, blonde, handsome lady, of American parentage and good family; aged thirty-seven; had suffered a miscarriage in the first year of her wedded state, about seventeen years ago, for the purpose of preventing offspring, and this resulted in serious and long-continued disorders of the generative organs. The patient came under my professional charge in 1872, suffering from endometritis, menorrhagic and metrorrhagic flows, uterine displacement, etc., but recovered her health almost entirely in the course of time, only remaining unfruitful, in spite of her earnest desire to become a mother.

The tedious, protracted illness and subsequent death of her husband, in the winter of 1878, caused a return of some of her previous troubles, and being in a state of great mental dejection, she imagined the presence of a uterine tumor—a spectre that had haunted her for many years past. I found, on a careful examination, no sign of a foreign growth, and in order to fully disarm the suspicion which yet lingered in her mind, sent her to Dr. T. G. Thomas, who entirely corroborated my view. When seeing the patient again, six months later, after her return from travel, I found her afflicted with severe frontal and occipital neuralgia of a malarial type, and with furuncular abscesses, all of which troubles yielded readily to an appropriate medical and surgical treatment, but seemed to leave her in an anæmic and somewhat exhausted condition. She complained, further, of a profuse flow at the menstrual period and of occasional

* Reported in *The American Journal of Obstetrics*, July, 1880

sharp pains in the pelvic region and back, but ascribing these symptoms to constitutional debility, and being also partially accustomed to them by previous long suffering, she felt disinclined to submit at the time to any special treatment, and preferred, with the aid of a tonic regimen and diet, to trust to nature for her entire recovery.

I did the best that could be done with tonics, but nothing appeared to exercise any beneficial influence upon her general condition, or to cause an abatement of her menstrual derangements. Feeling at last dissatisfied with this purely symptomatic mode of treatment, and suspecting a deeper, yet to me unknown, cause of the persisting hemorrhage and pelvic irritability, I strongly urged an examination, to which the patient finally yielded. I was indeed surprised and startled to find an extremely large fibrous uterine growth, of the existence of which the patient had not the slightest suspicion, and of which, only nine months previously, neither Dr. Thomas nor myself had detected the faintest vestige.

On inspection, the abdomen appeared quite prominent, and enlarged by a nearly uniform swelling, resembling gravidity between the sixth and seventh months, and upon palpating I felt through the yielding abdominal parietes a large and but slightly resistant tumor, of apparently smooth surface and rounded form, which moved simultaneously with the uterus on bimanual manipulation. Percussion yielded a dull note, corresponding to the area marked by the borders of the growth, and auscultation revealed a faint, but plainly audible sound, closely simulating the uterine souffle.

There was nothing particularly noticeable about the vagina. The vaginal portion of the cervix was remarkably shortened, looked downward and backward, and could be reached pretty easily. To determine the length and direction of the uterine cavity and the exact anatomical character and location of the tumor, I introduced the sound with great difficulty, and under varied manipulations, but succeeded in reaching the fundus. From the considerable enlargement and elongation of the uterine cavity and its crooked direction, the unequal outline of the uterus, the prominent bulging out of its posterior wall, and the peculiar curve described by the sound in passing up to the fundus, I was enabled to ascertain that the growth belonged to the intra-parietal order, imbedded in the muscular parenchyma of the anterior wall of the uterus, and that it did not project to or fill any portion of the uterine cavity. A rectal exploration confirmed this diagnosis, to the exclusion of any other disorder and complication. The growth, which gave to the palpating hand the impression of being rather soft and elastic, appeared to be a pure myoma; it extended vertically about six centimetres above the umbilicus, and measured transversely a little more than twenty centimetres.

Having obtained the patient's consent, I commenced the subcutaneous injection of ergot on the 31st of January, 1879, with a hypodermic syringeful, slightly diluted with distilled water. The first six were made every second day, but finding that they were well borne in every respect, I made the subsequent ones every day, regularly and uninterruptedly, and especially and intentionally during the course of the menstrual flow, which they appeared to regulate and control in a remarkable manner.

Three months after the inauguration of this treatment the case presented the following features: The menstrual discharge was almost normal in quantity and duration, and marked by a total absence of any unpleasant symptoms; the painful sensations about the pelvic region and along the thighs, together with the tenesmic feeling in the bladder and rectum, had disappeared; the anatomical size of the tumor was reduced to about seven and one-half centimetres; while the general health, strength, appetite, and cheerfulness of the patient were better than for years past.

Such was the state of things about the first of May, when the first mishap in connection with any treatment occurred, owing to an imprudence on the part of the patient, in leaving the house and walking for several consecutive hours, almost immediately after being injected, instead of resting in bed and applying cold compresses, as she had

invariably done in the past, under my directions. The immediate result of this indiscretion was a sudden and painful inflammation and hardening of the tissues in the neighborhood of the last point of insertion, which rapidly spread and was followed by a pretty severe abscess. As the abdominal walls were more or less involved in the inflammatory process, and the patient was suffering great inconvenience, I was compelled to suspend the injections, of which, up to that date, seventy-eight had been made. The patient, indeed, was anxious to have them continued, but my judgment did not approve of it. I resolved to suspend the specific ergot treatment altogether for the time, and give all my attention to the speedy cure of the abscess.

The abscess having kindly healed and all pain resulting from it having subsided, I resumed the subcutaneous injections, and continued them without further interruption to the last day of the next menstrual period, when the number amounted to ninety-five in all.

The uterus appeared then still somewhat larger than in the normal state, more markedly so in the transverse than in the longitudinal direction, but I could not detect any appreciable vestige of the growth itself, and that determined me to discontinue the injections and all further active treatment, and to transfer my patient to the healthful and invigorating sphere of country life, where the warm sunshine, air, bathing, exercise and nutritious food promised to complete the restoration of her health and strength.

In less than two months from the date of her departure I was summoned to her residence in the city and notified that, for the first time in seventeen years, the menstrual flow had failed to make its appearance.

Her subsequent history confirmed the suspicions of pregnancy, she having miscarried September 21st, giving birth to a four months' fœtus, and subsequently died of septicæmia.

79. A. KESSLER, M.D., 644 Lexington Ave., New York City, reports:—*

Mrs. C. S., a large lady, about thirty-eight years, was treated for incessant and almost fatal hemorrhages, consequent upon an immense submucous fibrous tumor, of many years' standing, with the direct result of causing not only a cessation of hemorrhage, but also an atrophic shrinking of the tumor itself, which rendered it harmless. For two years previous to my seeing her she had been treated by eminent physicians and specialists in New York and Philadelphia, and was most of the time a bedridden invalid, unable to take even moderate exercise. The effect of seventy-five hypodermic injections of ergot, with which I treated her, was to transform her into a perfectly healthy woman. July, 1880, more than two years have elapsed since, and the tumor has remained in *statu quo* without producing hemorrhage, etc., and it promises to make no further trouble in its present innocuous state.

Aug. 24th, 1887. The lady, Mrs. C. S., enjoys the most splendid health, and the tumor remains in its harmless state.

80. H. D. ENSIGN, M.D., Boone, Iowa, reports:—

Mrs. G. G.; occupation housewife; age thirty-one years. Puberty at fourteen years. Has five children, aged fourteen, twelve, ten, eight and two and one-half respectively. Two miscarriages occurred between last two children. Menstruation irregular previous to the removal of tumor, not profuse and little pain. Menses and leucorrhœa never became profuse. Tumor noticed after labor, May, 1884; estimated diameter one and one-half inches. During labor discovered a tumor on the right lateral wall of uterus, just above the opening of the right Fallopian tube. It was hard and attached by a base not quite as large as its diameter. By pressing this tumor against the wall of the

* See *American Journal of Obstetrics*, July, 1880.

uterus temporary relief from pain could be procured. For three days large doses of opiates were required to relieve the patient. Then commenced the use of Fluid Extract of Ergot, twenty minims, increased to thirty minims one week, given three times a day. In less than two weeks good effects began to appear, sloughing occurred, and the tumor was thrown off as a foreign body, portions of which I saw, as shreds and chunks of rotten meat.

81. JAMES A. STEWART, M.D., 611 Park Ave., Baltimore, Md., reports :—

Miss M. H., aged about forty-five years. Puberty at sixteen years. Menses regular and free up to thirty-seven years, when it became difficult and scanty, with considerable pain. About eight years ago a tumor appeared, size hardly perceptible. When first consulted found a hard mass in abdominal cavity resembling a four months' gravid uterus. Patient had been using Squibb's Fluid Extract of Ergot for about seven years. This treatment continued, in doses of one-half to one drachm three times a day, in combination with compound tincture gentian, for about a year, when the tumor entirely disappeared.

82. JAS. H. WHEELER, M.D., Dover, N. H., reports :—

Mrs. T. R., aged forty-two years. Puberty at seventeen years. Married at nineteen years. Has no children. Menstruation always regular until 1885, but since 1876 inclined to menorrhagia ; severe pain at times. Tumor first appeared in 1882, with an estimated diameter of six inches. The form of the tumor was interstitial. At times there have been severe hemorrhage, inflammation and pain. Have used Tilden's, Parke, Davis & Wyeth's Fluid Extract of Ergot, usually by the mouth, in the ordinary doses of these preparations, three or four times a day, not increased; but it greatly aggravated the pain, so that the patient finally refused to take it. Up to last January the tumor continued to grow, but since then does not appear to enlarge.

83. JESSE HAWES, M.D., Greeley, Colo., reports :—

Mrs. J. A. V., occupation housewife; color white; married about the age of 23 years; has two children, respectively one and three years. Menstruation regular previous to appearance of tumor, when it became too frequent, variable in time and excessive, but little pain. Leucorrhœa white, moderate in amount and constant during period of continuance of tumor.

Tumor first appeared in June, 1880, when menses and leucorrhœa became profuse.

Treated with fluid extract of ergot by the mouth, and a few times into the uterine tissue hypodermically. At first, one-quarter drachm four times a day during August and September; increased dose to one-half drachm three times a day, for two or three weeks. Good effects appeared by November, 1880. Began scarification of internal mucous membrane and submucous tissues of uterus to the depth of three inches. By early part of 1881 tumor had almost entirely disappeared. Attributed as much benefit to the scarification as to the ergot, though it was continued through entire treatment. Patient was in perfect health by May, 1881, and died suddenly from peritonitis, due to irritating food. I was not in attendance at time, and no post-mortem was made.

Tumor was situated in upper portion of neck and lower portion of body of uterus; posterior portion, when largest, about the size of hen's egg.

84. EDWARD B. WESTON, M.D., 3225 Vernon Ave., Chicago, Ill., reports:—

Mrs. B.; aged about 20 years; married one year. When first seen, the tumor and uterus were about the size of a cocoanut. Squibb's fluid extract of ergot given by mouth, in doses of about fifteen minims, with a like amount of tincture choloride iron; continued about six months. The tumor had by this time become so small as to be detected with difficulty. I have since attended her twice in confinement, and no trace of tumor could be found.

85. SAM'L P. DUFFIELD, M.D., Dearborn, Michigan, reports :—

Miss E. R.; a teacher; age 33 years; not married. Menstruation at 18 years; tolerably regular until about six years ago it began increasing; at last, excessive hemorrhage. Tumor first noticed in 1885.

Fluid extract of ergot was first used, and finally McKesson & Robbins' ergotine pills, as soon as the tumor was discovered by examination, by mouth, in four-grain doses morning and evening for one week; increased to three times a day for ten days, when, with the assistance of Prof. Jenks, the tumor was removed. It had a firm fibroid pedicle and measured three inches in diameter and four inches long.

86. FRANK L. HINSDALE, M.D., 122 Douglas Ave., Wichita, Kansas, reports:—

Mrs. L. M. E.; occupation housewife; color white; age 41 years. Puberty at 15 years; married at 19 years. Has no children; three miscarriages, in the years 1868, 1874 and 1877 respectively. Menses irregular, quite profuse, with severe pain at times. Leucorrhœa sanious, amount large, nearly constant.

Menstruation began to be profuse about the twenty-eighth year and leucorrhœa about the thirty-second or thirty-third year. The tumor was first noticed in the twenty-eighth year, with an estimated diameter of four to five inches at the present time, December 7th, 1886.

Three months ago began the use of aqueous and fluid extracts of ergot, administered by the mouth and hypodermically, beginning with a dose of two grains of aqueous extract on alternate days and fluid extract, fifteen drops, three times daily, with a present dose of six grains (hypodermically) of aqueous extract three times a week, and twenty drops of fluid extract three times daily. No bad effects except soreness of abdomen, from injections. The hemorrhage is lessening; has not been so profuse as the last two.

In January or February, 1887, the patient died, of pneumonia. Family says she was apparently improving as regards the tumor; hemorrhages had not been so frequent nor profuse.

87. W. A. QUIGLEY, M.D., Calliope, Iowa, reports:—

Mrs. L. N.; occupation housewife; color white; age thirty-four; puberty at fourteen years; married at eighteen years. Has seven children, respectively sixteen, fourteen, eleven, ten, eight, six and three years. Had three miscarriages. Menstruation regular; normal amount and pain until tumor appeared. Leucorrhœa bland, profuse, not constant. Menstruation and leucorrhœa began to be profuse seven months after last child was born. The tumor appeared about this time, with an estimated diameter of nine to twelve inches, supposed causes being malnutrition and general debility, excited by rapid reproduction and abortions. Began using fluid extract of ergot June 17th, 1886, hypodermically and by the mouth. At first, dose was one-half drachm; on fifth day, some discharge, continuing to ninth day, some blood; increased dose to two drachms every three hours. On eleventh day pain quite severe, no discharge. On thirteenth day pain severe, dose increased to three drachms every hour; five doses given. Quite a mass of the tumor expelled, weighing seventeen ounces, followed by smaller pieces and shreds. Decreased dose, and used iron for tonic. Result, recovery. August 27th, 1887. A recent examination shows no return of tumor.

88. G. B. LITTLE, M. D., 405½ Jefferson Street, Burlington, Iowa, reports:—

CASE I.—Mrs. S., aged fifty-three years; puberty at fourteen years; married at twenty years. Has seven children, between ages of twenty-five and nine years. Menstruation usually regular, though irregular of late, very profuse, amounting to hemorrhage; since 1884 great pain. Leucorrhœa very thin, copious, constant. The tumor appeared in January, 1885, in size eight by ten inches. Ergotine and solid extract of ergot commenced to be given by the mouth and hypodermically, one-half to one-grain doses, four

or five times a day. When given hypodermically caused cellulitis, and was discontinued. In January, 1886, after having been more or less constantly under the ergot treatment, at times combined with tonics, patient was seized with severe labor pains, continuing twenty-four hours. Examinations showed that the mouth of the womb was dilated and tumor was in vagina; the lower portion was friable and well advanced in decomposition. Used obstetric forceps, and drew the tumor as far down as possible; removed the forceps, and, by traction with hands, ligature and firm pressure over fundus by an assistant, was enabled to reach the pedicle, which was broad and attached to left fundus; removed the entire mass by laceration and écraseur. Large quantity of cystic fluid escaped during the operation, but no hemorrhage of importance, proving it was fibro-cystic in character. Substance of tumor was hard. Estimated weight at beginning of operation, ten pounds; actual weighing after, three and three-quarter pounds. Patient much enfeebled by drain of her system for months, and was septicæmic at time of operation, or very soon after, but made a slow recovery, and, although several years after time of menopause, menstruated regularly and normally from time of operation until the last six months or a year. No indication of return of disease. Recent examination shows womb to be normal in size and condition.

89. CASE II.—Mrs. A. H. K., aged thirty-nine years; puberty at sixteen years; married at twenty-four years. Three children, aged fourteen, eleven and four years. Menstruation irregular; profuse since 1880; pain variable in degree. Leucorrhœa mucopurulent and hydrorrhœal, abundant, constant; profuse in 1881. Tumor appeared in March, 1880; was six inches in diameter. Commenced use of ergotine, by the mouth and hypodermically, in doses of one-half grain, three times a day; gradually increased after two weeks. Three grains continued for two months. When used hypodermically caused cellulitis. In September, 1880, the tumor was expelled by the natural uterine contractions, very much resembling labor. It was intra-uterine in location and fibro-cystic in character. She made gradual recovery, and in less than two years became pregnant, had a natural labor and delivery, and has since enjoyed good health and gained materially in size and weight. Weight of tumor was not taken, but was probably three or four pounds.

90. C. R. REED, M.D., Middleport, Ohio, reports:—

CASE I.—Miss E. L. M., aged fifty-two years; puberty at sixteen years. Single. Menstruation regular, free, but not excessive pain. Leucorrhœa but little, not constant. Tumor first appeared in 1881; was about the size and shape of a large saucer, irregular and lobulated, being situated above the uterus, lifting it above the pelvic brim. Having been for several months previously treated hypodermically with ergot by Hunter McGuire, M. D., of Richmond, Virginia, in June, 1882, I prescribed ergotine and fluid extract, by the mouth and hypodermically. Severe pain was caused by large doses. The tumor gradually became less, and ceased to trouble her. About this time small fibroids appeared in and around left mammary gland. These attracting her attention, she soon lost annoyance from the abdominal one. She is now in good health, having passed menopause.

91. CASE II.—Mrs. R., aged about forty-two years. First marriage young, second about forty years. One child, aged fifteen years. Menstruation regular, but excessive, since second marriage. Tumor first noticed soon after second marriage; size six or eight inches in diameter. In February, 1887, was anæmic, from excessive hemorrhage, but use of ergot, both by mouth and hypodermically, was commenced, occasioning some pain. In a few days hemorrhage had ceased and strength increased; since that time has done her housework. Menstruation regular, but not excessive.

92. CASE III.—Mrs. S. R., aged fifty years; puberty at sixteen years; married at forty-six years; no children. Menses regular, slight pain, not excessive. Tumor

appeared in June, 1885. In September, 1885, fluid extract of ergot was used, by the mouth, in one drachm doses, three times a day. On the 30th of September there was an apparent diminution in size of tumor, with relief of the other symptoms, and she is reported well.

The cases of uterine fibroids that have come under my observation have been in the unmarried or sterile.

93. E. A. WAGGENER, M. D., Carrollton, Mo., reports :—

CASE I.—Mrs. S., aged forty-seven years; puberty at fourteen years; married at fifteen years; has nineteen children, ranging from thirty-one to three years. Menstruation regular from puberty to marriage. After child-bearing began, the menses were never seen until about thirteen months after birth of last child, which was two years before coming to me. An imperfect account of some leucorrhœal discharge eighteen months before coming to me, none at the time. Tumors first noticed July, 1882, three in number, two submucous and one subserous, estimated four and one-half inches in diameter, average size. There was also a polypus attached to right wall of uterus, about midway between os internus and fundus, and which presented at os externum. There was constant metrorrhagia, with profuse flooding at menstrual periods. Patient was almost discouraged, unable to walk or sit up, when I first saw her. The upper tumor was at first interstitial, or intra-mural, which, in the course of a few months, became more nearly subserous as it diminished. The second tumor was submucous and located in the left side of uterus. The third was also submucous, and occupied the lower and anterior portion of the body and the anterior wall of the cervix. This tumor impinged upon the urethra, and at times caused great difficulty in micturition. Patient presented the appearance of full term of pregnancy, though the exterior conformation was irregular. Cause, rapid child-bearing; family history excellent. I took patient to Dr. Mudd, of St. Louis, who removed the polypus with a curette. Phlebitis ensued, from which she never fully recovered.

The patient was placed upon fluid extract of Squibb's ergot, July, 1882, ten minims a dose, three times a day, with opiates as needed for pain; continued till September, 1882, when she was taken to St. Louis. Do not know what she took at the hospital. On her return, in December, 1882, again put her upon the same, alternating every two weeks with liq. potass. arsenit., five minims, comp. tinct. iodini, fifteen minims, three times daily. If effects of arsenic were manifested sooner than two weeks, the former prescription would be resumed, otherwise, this would be continued. The constitutional effects of arsenic were visible several times during progress of case. After return from St. Louis, the tumors continued to decrease in size very rapidly. At time of death could detect no trace whatever of either of the tumors above the cervix. The cavity of the uterus was normal in length, though cervix was considerably elongated. The tumor situated in the cervix, though reduced more than three-quarters in size, seemed to increase in its pressure upon the urethra, and did finally occlude it entirely, causing death in this way. Patient lived ten miles in the country, and visited me only once in six to ten days. Tumor seemed to have pressed suddenly, for at last visit she was doing well. Was having a catheter made especially for her, and think, had I been warned of her condition in time to have introduced it and kept it in position, she certainly would have been saved. She had been using ergot for five hundred days. Only bad effects being too great uterine contractions occasionally, and nausea at times, when would use anodynes to relieve pain.

94. CASE II.—Mrs. G., white, aged forty-five years; puberty at fourteen years; married at seventeen years; has five children, ranging from twenty-six to ten years. One miscarriage at first pregnancy. Menses regular. Had had leucorrhœa at times for years. Quite free for past two or three years. About eighteen months before coming to me her

menopause had begun. For the last five or six months menstrual flow had been exhausting. She was very weak, pale and unable to sit up; flooding at time of coming to me. By digital examination, I detected a tumor. At once administered one-half drachm of Squibb's ergot and anodynes as needed, and tamponed vagina; put her to bed; continued ergot for two days. Flow ceasing, made thorough examination, finding intramural fibroid, estimated three and one-half inches in diameter, on right wall of uterus, July, 1883. The patient took ten minims of ergot with tinct. iodini comp., fifteen minims, four times a day. After two weeks was given three times daily and alternated every two or three weeks with potass. iodidi, five grains, liq. potass. arsen., five minims, three times a day. Menses did not appear for two months; when they did, she kept perfectly quiet in bed. Ergot, with anodynes, administered as at first. Flow not free, did not last long. Tumor had reduced perceptibly by this time, and she was able to be up. Went home, twenty-one miles into country, one week after second flow. About two and one-half months after menses appeared, but flow not sufficiently free to cause any annoyance. Returned nearly three months after this time; examination showed tumor almost gone. She had gained in flesh, strength, appetite; treatment continued for two months longer, when tumor entirely disappeared. Used ergot seven and a half months. May, 1884, no return.

95. Case III.—Mrs. R., white, aged fifty-one years; had several children, all grown. Had had no menstrual flow for about a year; prior to that time it was irregular and very copious. Tumor had appeared in 1882; called in consultation July, 1884, on account of severe hemorrhage and metrorrhagia up to the time of my visit. Size ten inches in diameter. Was submucous and situated in fundus; cervix destroyed, os externum very patulous. Tumor felt through the os. Treatment similar to Case I. Patient confined to bed. Ergot, with anodynes, with tampons, used a few days. Marked uterine contractions produced; so much so, ergot reduced. Patient lived in country and attended by another physician, who reported good progress. September 5th, patient came to office; tumor had reduced one-half. By October, 1886, all traces of tumor had disappeared; patient's health perfect. Uterus was normal in every respect except some anteflexion. Ergot used for one hundred days. Flow never returned after ergot was begun.

96. Case IV.—Another, aged thirty-five years; tumor intra-mural; size of a man's fist. Metrorrhagia and menorrhagia for some seven months; very much reduced in flesh and strength. Had several children. General health had always been good. The same treatment pursued for eight months, when patient reported well.

97. Case V.—Another, aged forty-three years; had five children, youngest about eight years. Detected tumor only a few days before I was sent for. This patient was tall, slender, and in rather poor general health. Loss of blood completely prostrated her. Tumor was estimated to be about three inches in diameter. Submucous, in left latero-posterior wall. At my suggestion the ergot treatment was begun. Great improvement was reported in three months; complete recovery in nine months.

98. Case VI.—Mrs. N., white, aged thirty-four years; puberty at fourteen years; married at nineteen years; one child, aged thirteen years. Menstruation regular; considerable pain, excessive for eight months. Tumor interstitial; lower and anterior wall of uterus, involving os internum and impinging on urethra. About four by five and one-half inches. Quite noticeable above pubes. Great difficulty in micturition. Squibb's fluid extract used, same as in other cases. Ergot produced nausea at times. The tumor threatened occlusion of urethra at first. Took patient to Dr. Barret, of St. Louis, who made deep incisions into tumor, causing pelvic cellulitis. Remained in hospital four weeks, with no improvement. After seven weeks, patient was taken back to Dr. Barret, who expressed great surprise at the progress it had made. Tumor then the size of a guinea egg. Cellulitis resulted in abscess, which broke through cervix near internal os and opened about nine weeks ago. Has improved very rapidly since; tumor has

reduced progressively; is not now larger than the end of the index finger. Since emptying of abscess, menses have greatly reduced in quantity; always regular. Has taken the ergot eleven months of the past thirteen.

99. THEODORE R. VARICK, M. D., Jersey City, reports:—

CASE I.—Mrs. McG., a widow, aged forty years; has one child. Tumor first noticed in November, 1866, about the size of a small hen's egg, which grew steadily until November, 1867, when I found the fundus uteri was on a level with the umbilicus. Eight months ago she was attacked with hemorrhage, which recurred at short intervals, producing extreme prostration. The os tincæ was found sufficiently open to admit the first phalanx, and enabled me to recognize a foreign body. The sound, which I was able to pass within the uterine cavity to the depth of six and one-half inches, revealed a tumor in the anterior wall, extending from the cervix to the fundus uteri, with smooth surface, firm, and projecting into the cavity of the womb. A process of dilatation was commenced in November, by means of tents of sponge, and continued until December, when os was the size of a half-dollar. Then administered fluid extract of ergot in one-drachm doses every hour until powerful uterine contraction was produced, which had the effect to engage the lower part of the growth in the expanded cervix. With the assistance of B. A. Watson, M. D., of Jersey City, removed, piece by piece, as much of the tumor as was within reach, leaving the balance to be thrown off by uterine contraction. This last was effected in nine hours; came away en masse; was fibrous in character, weighing fifteen ounces.*

100. CASE II.—Mrs. H., aged fifty years; puberty at fourteen years; married at eighteen years; no children. Menstruation regular until the age of twenty-five years; rather profuse, much pain since. Leucorrhœa yellowish, considerable. Tumor first noticed about thirty years ago. Commenced the use of ergotine pills, three grains three times a day, with muriate of ammonium, ten minims three times a day, in 1882; continued eighteen months. Within a month marked diminution of hemorrhage; none to amount to anything since. Has had no "show" since spring of 1886. Two years ago had a disagreeable pelvic abscess, opening both into the vagina and rectum. Tumor decreasing rapidly in size.

101. J. J. NORTON, M. D., Monroe City, Mo., reports :—

Mrs. M. J. N., aged forty-two years; puberty at seventeen years. Married at twenty years. No children. Menstruation medium and regular until last three years. Leucorrhœa thin, light colored, constant for two years. Tumor noticed about one year ago, three by four and one-half inches in size. Three months ago used fluid extract of ergot by the mouth, one-half drachm three times a day. A. E. Gregory, M. D., of St. Louis, diagnosed the case interstitial or mural fibroid of uterus, on right side of organ. Complained of much pain; numbness of right leg, in which veins were enlarged. Since use of ergot, tumor not enlarged. Menorrhagia greatly lessened. Leucorrhœa equally benefited. Pain in the leg not so distressing, but has been less on her feet than before treatment.

102. J. H. HOBART BURGE, M. D., 132 Montague Street, Brooklyn, N. Y., reports :—

Mrs. R., aged thirty-five years; married about twenty-five years; had never been pregnant; consulted me in 1875 for profuse menorrhagia. Her hemorrhage was terrific to the last degree, and she was blanched. I found the uterus about spherical and the size of pregnancy at six months. Used Squibb's fluid extract of ergot, five grains three times a day. It soon produced its physiological effect. The medicine continued for several weeks, dose raised from time to time. Gradually, but steadily, size of tumor diminished to about half former size; from that time to this, a period of twelve years, has remained dormant, menstruation normal and general good health.

* *Medical Record*, Vol. III, page 3, 1869.

103. PAUL C. YATES, M.D., Neosho, Wis., reports:—

Mrs. T. Y., aged forty years; married about twenty years; eight children, ages twenty-one to one and a half years. Menstruation normal until March, 1886. Tumor noticed July, 1886, two inches in diameter. In April, 1886, used fluid extract of ergot by the mouth, one teaspoonful every four hours. Used three months, but not continuously. After she had taken two ounces of ergot, was called, July 15th, in haste; found her bloodless, blanched, pulseless and unconscious; made an examination, and found a tumor, about the size of a turkey's egg, in cervix and vagina; in her state of syncope had not any trouble in forcing it down to the vulva, and ligating. Gave stimulants and did not remove it till the next day, then with a blunt pair of scissors. Made a good recovery; is now quite well. The ergot had forced the tumor from the uterus. The pedicle was one-half inch in diameter; tumor itself solid, feeling quite hard.

104. PROF. JAMES H. ETHERIDGE, M. D., 1634 Michigan Ave., Chicago, Ill., reports:—*

Mrs. A. B., aged forty-three years; married twenty-eight years; mother of three children; first suffered from menorrhagia six years ago. Three years ago this fall I first saw her. She was losing an alarming quantity of blood at a menstruation then. Ergot seemed to be all that was needed at that time. Since then she has had dangerous hemorrhages every fall. During the settled cold weather of winter, and in the spring and summer I have seldom had occasion to see her.

The first thorough examination permitted, in 1882, revealed the usual objective symptoms of an enormous submucous, uterine, fibrous tumor. The top of the *fundus uteri* extended one inch above the umbilicus. The lateral diameter equaled its longitudinal diameter. The sound was passed into the uterus eleven inches. Very little or no rectal or vesical disturbance was ever experienced. The principal inconveniences experienced were hemorrhage and a "high stomach."

Generally speaking, she has been an exceptionally healthy women. She has had a great many induced miscarriages—cannot tell how many. She has been repeatedly brought to death's door from the hemorrhages following abortions. Aside from these experiences, she has never been sick except when in childbed. There appear to have been no attacks of localized peri-uterine peritonitis, so very common in the history of uterine tumors. Her recuperative powers are simply astonishing. She seems to belong to the class of women that, Keith says, "cannot be killed."

Two years ago this fall I visited her for a hemorrhage so severe that a sponge tent had to be used. Its use was supplemented by ergot and rest. She was blanched to a surprising degree. However, in a few days she was up and around, and in her usually vigorous health. During the winter months following, she had several menorrhagias, but I was not summoned, she, instead, resorting to rest and ergot, and recovering as usual.

On November 12th, 1884, I was summoned to care for her in a most unpromising condition. She had been under the care of a homœopathic physician, called to her when she was having her customary frightful first hemorrhage of the autumn. It was then thought best to retain him in charge of the case. During his care of her, a consultation was held with a regular physician, who deemed incisions of the cervix the proper thing to do to prevent repetitions of the hemorrhages—a proceeding first adopted by Baker Brown. This cutting procedure was followed by a double crural phlebitis and its resultant enormous anasarcous distention of the legs.

But she rapidly began to renew her blood, the pallor gradually disappeared, and in less than thirty days she was up and around her room, and in sixty days she was off on a journey.

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* In *Chicago Medical Journal and Examiner*, January, 1886.

During the remainder of the winter, the spring and summer, up to the time of her customary autumnal hemorrhage, she had enjoyed exceptionally good health.

This last hemorrhage began October 8th, 1885, and was allowed to go on twenty-four hours before I was summoned. I saw her at 5 A. M., and used a sponge tent at once. It was soon forced out, and at 4 P. M. I introduced three sponge tents into the cervical canal and gave her an enema of ninety minims of fluid extract ergot, and then the trouble began.

Such powerful uterine contractions followed this use of ergot, with their accompanying pain, that the capsule of the tumor was ruptured. The hemorrhage ceased at once and permanently.

She had, however, lost so much blood that her lips were colorless and the cardiac movements irregular and jerky. The foot of the bed was considerably elevated, and food and stimulants were freely used. Two days thereafter a strong odor was first observed from the sanious vaginal discharge, and examination revealed in the vagina the commencing extrusion of the grangrenous fibrous tumor. The next day the os was found completely dilated and about one pound of the tumor was pulled and cut away. Without exception, it was the most disgustingly nauseating work that I ever did. The odor had become most sickening. The tumor was pultaceous, excessively friable, and very difficultly graspable. The day following I succeeded in getting away about a half a pound of the tumor. Two days later I succeeded in cutting and dragging away about as much more. By this time the advanced portion of it was projected through the vulva and spread out over the labia in the shape of a whitish, salvey, sticky mass of ineffably nasty, malodorous putridity that was enough to test the equipoise of one's stomach to a most trying degree.

The uterine contractions, with their resultant pressure, were a most conspicuous feature of the patient's condition. She was incessantly under the influence of ergot, a fact that she was wholly ignorant of then, and is still, for aught I know. Much relief was always experienced when pieces of the growth were removed in the operations.

Three days later, with the patient under ether, assisted by Prof. Parkes and Drs. Marcusson and Mitchell, of the Presbyterian Hospital, I attempted to remove the entire remainder of the tumor. The attempt was only partially successful. About two pounds more were removed. Some small solutions of continuity of the vaginal tract were made during the operation this day and no sepsis followed, although a creamy, ichorous stream of gangrenous *débris* was constantly flowing from the uterus for several days thereafter, affording another illustration of inability to kill this woman by any common causes.

After recovering her consciousness from anæsthesia, she went into collapse and nearly died. She became pulseless, delirious, cyanotic, the breathing was very labored and sputtering, intense restlessness supervened, vomiting came on and she bade fair to expire in a few moments. I never saw a human being approach so closely to the portals of death, and not enter them. Brandy by the mouth, rectum and hypodermatically, hot applications externally and digitalis under the skin seemed to save her. Six ounces of brandy were used in less than two hours. After a time she reacted fully, and soon began again the use of concentrated food and free stimulants.

Five days thereafter I was enabled alone to cut, pull and tear away about one pound more of the tumor. By this time she was in a most unpromising condition. She was becoming icteric, her stomach rejecting nearly everything and yet she was tormented by incessant thirst. Her pulse was becoming progressively weaker. The rectum was the only means remaining to nourish her through, and around this viscus an abscess in the cellular tissue had begun developing. In addition to this, several small abscesses began to trouble her greatly where the subcutaneous injections of

brandy and digitalis had been made. The horrible fetor of the vaginal discharge was unabated.

Five days later another and final attempt at removal of the tumor was made, and I was enabled, unaided, to remove nearly a pound more of the growth. During the five days preceding this last attempt at removal, the uterus had decreased in size quite rapidly. The fetid vaginal discharge had been exceptionally free, showing that the uterine contractions from ergot were a powerful adjunct in effecting expulsion. At this last operation I was enabled to secure a large part of the pedicle with the écraseur. An attempt at securing a second piece similarly, resulted in breaking the écraseur wire three times. Fortunately I was able at this operation to grasp and cut away considerable pieces of the stump.

In all of these operations it was impossible to do more than was done at each sitting. The patient became easily exhausted and could endure no longer. When I etherized her, I expected to remove the entire mass, but the extreme friability of the accessible portion of it utterly precluded drawing it down. Everything depends on the possibility of pulling down the mass when it is desired to remove the whole tumor. In this case I was reduced to the necessity of subjecting the patient to several operations and of letting her run her chances of escaping fatal septicæmia. When enough of the tumor was within reach to remove, she was subjected to a repetition of the trying ordeal. Each succeeding operation was productive of more and more exhaustion.

From the beginning to the end of the time of the discharge, per vaginam, of the deliquescent putridity of this growth was a period of fully three weeks. During nearly all of that time I was almost sure that she would succumb. All authorities agree in saying that a very large share of patients who shed uterine fibrous tumors by gangrenous disintegration die of blood poisoning. Consequently, I fully expected my patient to die, but she finally recovered.

I can only estimate approximately the probable weight of the tumor. I removed—I should say—about six pounds, by weight, of it. It is fair to estimate that, *at least*, as much more came away in a semi-liquid form; for during a period of fully twenty-one days there was an incessant flow of a yellow stream of gangrenous detritus from the uterine cavity. Hence the conclusion may be safely reached that the tumor must, originally, have weighed twelve or thirteen pounds.

Aug. 29th, 1887. Is in good health, menstruating regularly; no return of disease or of symptoms since recovery.

105. F. E. POTTER, M. D., 513 Francis Street, St. Joseph, Mo., reports:—*

CASE I.—In 1879 a lady, twenty-eight years of age, was brought to me by Dr. Franklin, of near Osborne, Mo. She had been married several years, but had never borne any children. She suffered very much from menorrhagia. We found, upon examination, a fibroid tumor of the uterus, and as she lived quite a distance from either of us, and was compelled to stay at home, we could not use ergot hypodermically, so placed her on the following treatment: Twenty minims of fluid extract of ergot, three times a day, and tincture of iodine, six minims, three times a day. This treatment she kept up promptly, and in three weeks experienced much improvement, and in six months she was well.

106. CASE II.—Mrs. C., aged forty-six years, and mother of two children. Had not menstruated for two years; applied to me in November, 1881, suffering with a fibroid tumor of the uterus, reaching almost to the umbilicus. She was suffering great pain in the neighborhood of the tumor, and it was to relieve this I was first called. I placed her upon one-half grain of ergotine dissolved in glycerine, given hypodermically every

* In *Transactions* of Medical Association of Missouri for 1883.

third day, and compound tincture of iodine, six minims, three times a day. Under this treatment the pain was relieved, and the tumor rapidly reduced in size until it was almost gone. Afterward died; cause unknown.

107. CASE III.—Mrs. D., aged thirty-nine years; applied to me September, 1881, with a very large tumor, reaching to the ensiform cartilage. She wanted it removed, and insisted upon an operation. Upon thorough examination, I found it to be a fibroid tumor of the uterus. The blood vessels supplying it could be felt pulsating very distinctly, and I told her, under no circumstances would I attempt to remove it surgically, as I was confident she would bleed profusely, and if the tumor was not adherent to the wall of the abdomen or some of the viscera, the incision would have to be so large that I could not make it without the very greatest danger. She consented to let me give her ergotine on trial. This I commenced December 1st, using one grain each alternate day, also tincture iodine, six minims, three times a day. The improvement was very rapid at first. After giving the first hypodermic injection of ergotine, the pulsation, which was so marked, ceased. The reduction kept up for about six weeks, when it seemed to stop, and I could not make any further impression on the tumor, although I increased the dose to two grains, given as before. Then determined to use sclerotic acid, commencing with one-half grain dissolved in water, used hypodermically. The action was very marked. The patient claimed she could feel the tumor contracting in half an hour after the administration, and said it made her head feel strangely, and her feet and hands cold. I thought it was imaginary, until the same symptoms presented themselves the second time; with this addition, she was sick at her stomach. I thought to discontinue, but she insisted that it should be kept up, and I did so. The effect gradually passed away, and the reduction was less perceptible, until it ceased altogether. Kept the medicine up for two months, then ceased, and resumed in six or eight weeks. The tumor refused to diminish any further, so finally stopped entirely. The tumor was now much smaller than in the beginning, the upper border only reaching to the umbilicus, instead of to the ensiform cartilage, being one-half smaller than at first. Patient is in excellent health, and claims to be able to do all the work she ever could.

108. CASE IV.—Mrs. W., fifty-two years old; consulted me, about the 15th of February, 1883. She had a tumor reaching two inches above the umbilicus. It was very firm, but movable. It was distinctly divided into two parts by a contraction in the centre. The right side was a little the larger, but there was no marked difference. Placed her on compound tincture of iodine, seven minims three times a day, fluid extract of ergot twenty minims three times a day, and one and one-half grain ergotine once a week, hypodermically. Before the beginning of the treatment, she suffered with menorrhagia to the extent of ten or fifteen days each month, and the loss of blood greatly prostrated her. The medicine gave her relief in that direction at once, for the flow became moderate, and lasted for only about three days, and each time diminished in quantity. The tumor has reduced very much in size. The left side has decreased much more than the right. The upper portion of the growth is now one inch below the umbilicus. She is gaining strength each week. Hemorrhage ceased in August. The tumor has disappeared; some enlargement of the uterus still remains, but not much; canal measuring three and one-half inches in length.

109. GEO. MINGES, M.D., 989 Clay St., Dubuque, Iowa, reports:—

Mrs. M. V.; housewife; puberty at 14 years; one child, thirty years. Three miscarriages; 1st 1856, 2d 1865, 3d later. Menstruation regular; preceding breaking of tumor absent two months; now somewhat irregular. Some pain. Leucorrhœa only during pregnancy, none during existence of tumor. The tumor first appeared in 1882, size of a fœtal head at term. Used aqueous extract of rye ergot by the mouth, two

grains, three times a day, combined with five grains ammonium chloride, probably for a month. After having taken ergot for three or four weeks, patient suddenly felt a painless discharge, which proved to be a large lump of matter looking like boiled starch, and for three or four weeks there was a thick, yellowish discharge, which stiffened linen. Improvement of subjective symptoms began at once, and objectively the cervix was found to have regained its normal position, while before it had been pressed tightly against the os pubis, but size of tumor had not been much diminished. There was no discharge of blood. Menstruation had been suppressed for two months previous to occurrence of purulent discharge.

Examination in July, 1887, showed the cervix to be in normal position and fairly movable. Could not detect any tumor by vaginal examination, but abdominal palpation revealed a hard mass deep in the region of left ovary, perhaps the size of fœtal head. Menopause has not arrived, but menstruation appears only once in two or three months, lasts three days, but is rather more profuse than formerly, and accompanied by headache, which was not the case while regular. Otherwise, there are no subjective symptoms, and patient considers herself perfectly cured.

110. Drs. Pixley and Boerstles, Peninsula, Summit Co., Ohio, report:—

Mrs. M. J. B., aged 45; puberty at 14 years; married at 23 years; has had no children. Menstruation very regular until 25 years; normal, with no pain. Leucorrhœa thick and tenacious, though not excessive, nor frequent. Menses began to be profuse about twenty-fifth year. Leucorrhœa never profuse. Tumor first appeared about 1867, with an estimated diameter of fully twelve inches, reaching above the umbilicus and extending low down into the pelvic cavity. Commenced in November, 1886, to use fluid extract of ergot, twelve minims, three times a day, increased to twenty. No bad effects whatever, but marked improvement from very first. Has been under treatment less than two months, and the size at umbilicus is five inches less.

111. W. S. Huselton, M.D., 17 Stockton Ave., Allegheny, Pa., reports:—

Mrs. B. who had, after I took charge of the case, three miscarriages, at about two, three and four months, respectively. She had an intra-mural fibroid tumor about the size of a large orange; had pain and severe hemorrhage. Treatment consisted of the internal administration of Squibb's fluid extract of ergot and iron in doses of fifteen to thirty or forty minims, three times a day, regulating amount according to effect. The tumor became greatly reduced, she became pregnant the fourth time, went full time, gave birth to a perfect and well-developed child, living and well to-day, eight or nine years old. The mother has never had return of trouble, and enjoys excellent health.

112. De F. Willard, M.D., 1818 Chestnut street, Philadelphia, Pa., reports:—

Mrs. A. S., aged thirty-four years; married at twenty-four years. No children; one miscarriage, at twenty-five years. Menstruation normal ; dull pains. Tumor noticed about two years. Is now two inches in diameter. Six months ago used ergotine, three grains three times a day. Good effects appeared about two months after treatment instituted. Tumor on posterior wall of uterus, just above cervix

113. James M. Barlow, M.D., Yale, Ill., reports:—

Case I.—Mrs. A. C.; aged thirty-two years; married about eighteen years; three children. Menstruation regular ; severe hemorrhage four or five months before the tumor was delivered. Tumor probably four inches in diameter—noticed for eighteen months, and thought she was pregnant. About seven hours before delivery had severe hemorrhage, when I administered fluid extract of ergot, one-half to one teaspoonful every one and a half hours, until the tumor was expelled.

114. Case II.—Mrs. J. F., aged about forty-five years; puberty at sixteen years; married about eighteen years. Two children, aged twenty-one and seventeen years. Called as consulting physician about fifteen or sixteen years ago.

Fluid extract of ergot was given, thirty to sixty minims every three minutes for a short time, six or eight hours, when the tumor was expelled.

115. A. S. KINNAMAN, M. D., Hornersville, Ohio, reports:—

Mrs. M. W., aged forty-three years; puberty at thirteen years; has no children. Menstruation irregular; profuse since four years ago; no great pain. Leucorrhœa light, sometimes becoming fetid and yellowish. Tumor noticed in 1881, the uterus being as large as an eight-month pregnancy. In October, 1886, began use of fluid extract of ergot by the mouth, administered in doses of twenty minims, increased to forty minims, three times a day. Large doses produced vomiting and constipation, so great as to necessitate the discontinuance of medicine. Tumor increased in size. Used again, but with ill effects. Tumor decreasing under hydrarg. protoiodide, one-quarter grain three times a day.

116. I. C. HAZLETT, M.D., Uniontown, Pa., reports:—

Mrs. I. A. G., white, aged forty-two years; has three children, aged 12, 10 and 8 years respectively. One miscarriage, in 1879. Menstruation regular, normal, no severe pain until 1879. Leucorrhœa muco-purulent, profuse soon after 1879. Tumor noticed in May, 1882, about three inches in diameter. Commenced at that time the use of fluid extract of ergot by the mouth; in one-half to one teaspoonful doses; not increased on account of pain. Hemorrhage and, to a certain extent, leucorrhœa, ceased, but patient could not be induced to take ergot, on account of pain. In February, 1884, called to see her, and found tumor in vagina, and removed it with ècraseur, which was fully the size of a fœtal head at term. Made a good recovery, and is since well. No ergot used except as stated above.

117. A. C. BERNAYS, M.D., 903 Olive street, St. Louis, Mo., reports:—

CASE I.—Miss S., aged twenty-six years; puberty between sixteen and seventeen years. Single. Menstruation regular until, six months before treatment, it became profuse and painful. Leucorrhœa noticed during past year; became profuse six months since. Tumor diagnosed in January, 1887, when commenced the use of fluid extract of ergot by mouth, drachm doses, and one-half drachm doses hypodermically. Caused labor pains, resulting in the expulsion of tumor into the vagina, when the pedicle was cut off with ècraseur and tumor removed. Tumor soft, submucous fibroid, and had been forced into cavity of womb. Weighed seventeen ounces. Patient made good recovery.

118. CASE II.—Mrs. W. Y. G.; occupation midwife; aged forty years; puberty at thirteen years. Married about seventeen years. One child, aged fifteen years. Menstruation regular; profuse during last four or five years. Leucorrhœa slight. Tumor noticed three years ago, size of womb at full term. Fluid extract of ergot was used by the mouth and hypodermically by several physicians before I began. I administered it by injection into the womb and tumor itself for several months, in doses of one increased to two syringefuls at each treatment. The ergot had scarcely any perceptible effect on the size of the tumor. Performed laparotomy, but closed the abdomen on finding that the tumor was an immense fibroid which had undergone cystic degeneration; in fact, was a cystic myoma of the uterus, which was adherent to the omentum, to the bladder, to the sigmoid flexure of the colon and also the linea innominata. I punctured a number of cysts; some contained a bloody-looking fluid, which was heavily loaded with crystals of cholesterine. One cyst, punctured with a large trocar per vaginam, discharged over two quarts of the cholesterine-bearing fluid. Tumor much reduced in size by this treatment. Patient made a good recovery after the laparotomy, and is now enjoying good health.

119. CASE III.—Mrs.——, aged about forty years; puberty at fifteen years. Menstruation regular until two years ago. Some pain, severe for a few hours. Menses became

profuse nearly two years ago. Leucorrhœa at the same time. Tumor appeared at the ago of thirty-eight years, the size of a large orange. It was situated in the parametrium and pushed the womb to the opposite side; was intra-mural, at least partially. Used Squibb's fluid extract of ergot hypodermically into the substance of the womb and tumor, also given by the mouth in one-half teaspoonful doses, three times a day, with iron, during several months. The injection was one gramme increased to two grammes. The tumor commenced to decrease in four treatments, and has entirely disappeared.

120. J. D. KINGSBURY, M.D., Browns, Ill., reports:—

Mrs. S. A. C., aged 32; puberty at 14 years; married at 28 years. One child, sixteen months. Menstruation irregular, profuse; considerable pain since September, 1886. Tumor first noticed in December, 1886, three inches in diameter. Used Squibb's fluid extract of ergot hypodermically, one-half drachm each day, gradually increased to one drachm. The tumor was of a subperitoneal variety. Called J. Schneck, M.D., of Mount Carmel, in consultation. Found great difficulty in finding a long enough needle to reach the tumor through the speculum, for good effects only followed when ergot was put far into the body of the tumor. Tumor pressed on rectum so as to cause constipation previous to treatment. Decreased rapidly after ten days; since treatment discontinued, patient has done her housework, and menses are regular.

121. J. K. MILBOURNE, M.D., Mechanicville, Iowa, reports:—

Miss M. G.; seamstress; aged 33 years; puberty at 14 years; single. Menstruation normal; commenced to be profuse in August, 1885; leucorrhœa light color and tenacious; became profuse in 1885. Tumor first noticed in November, 1885, size one and a half inches in diameter. Treated immediately with fluid extract and ergotine, by mouth, one grain ergotine four times a day, not increased. Almost immediately good effects appeared in stopping of hemorrhage. By constant use for three months, size of tumor was reduced fully one-half. Patient has no trouble at menstrual periods; has stopped medicine; considers herself well.

122. W. L. C. HAWK, M.D., Greenburg, Kansas, reports:—

Mrs. M. S., about 45 years; married at 20 years. Four children, aged twenty-seven, twenty-four, twenty-two and eighteen years, respectively. One or two miscarriages. Menstruation not regular, considerable pain, profuse about eighteen years. Leucorrhœa a little acrid, not constant, commenced to be profuse at thirty years. Tumor appeared at age of thirty-eight or forty years, four and a half inches in diameter. Commenced treatment by ergot in summer of 1884, by mouth, using half teaspoonful of fluid extract every six hours, increased to one teaspoonful every five hours. Marked improvement two months after beginning treatment. Diminution of tumor and of leucorrhœa, increase in weight and improved general health.

September 1st, 1887. Menses had not ceased when patient was last seen, but the treatment of tumor was a success.

123. W. J. WEBB, M.D., 318 E. Division St., Chicago, reports:—

Mrs. H. M.; aged 31 years when died; married at 29 years; no children. Menstruation somewhat irregular and profuse since twenty-six years old. Leucorrhœa occasionally, but not profuse. Tumor noticed in twenty-ninth year, about four inches in diameter, situated in right half of the uterus, and involved to some extent the lower zone. It was interstitial. Used ergot, fluid extract, by the mouth and hypodermically in doses of fifteen minims, three times a day, which induced the usual phenomena of ergotine as it affects the nervous system. No symptoms referable to the uterus and no convulsions. After an interval of two weeks commenced use of Squibb's aqueous

extract, five grains, three times a day, for six weeks, with an interval of two weeks. The remedy, when used in both ways produced slight vertigo, numbness in extremities, tinnitus aurium and headache at times, and ergot was abandoned. It seemed to stimulate the growth of the tumor, which increased very rapidly. Potass. iodide and chlorate were tried, with negative results. She became pregnant when the womb was about seven inches in diameter, and it continued to grow very rapidly until three weeks before normal period of gestation, when labor set in. After it had lasted for four days, with increasing intensity, she was delivered by means of a tedious craniotomy. Three days after she died, from exhaustion and septicæmia. After delivery the uterus was as large as it should be at term.

124. T. A. Foster, M. D., Portland, Me., reports:—

Case I.—Mrs. A. W., aged fifty-seven years; puberty at fourteen years; married at twenty-two years. One child, died at age of twenty-two years. Menses quite regular, abundant, a great deal of pain; became profuse at thirty-five years of age. Leucorrhœa thin and light; not excessive nor constant. Tumor appeared about the age of thirty years; diameter four inches at present, more than twice this size fifteen years ago. At the age of thirty-eight years commenced the use of fluid extract and powder of ergot, by the mouth, in doses of ten to twenty minims three times a day, or powder one to three grains, frequently changed but not much increased in dose. Hemorrhages were fearful at times, and, what seemed most alarming, the tumor seemed to take on inflammatory action every now and then, for two years before menopause. After this all serious symptoms subsided, tumor gradually decreased in size, health became fully restored, and, finally, all treatment was stopped ten years ago.

125. Case II.—Mrs. C. M., aged fifty years; puberty at thirteen years; married at twenty-one years. Four children, aged twenty-two, twenty, eighteen and sixteen years, respectively. Menstruation regular, about normal quantity, until between thirty-five and forty years it became uncertain and finally profuse. Leucorrhœa green and irritating most of the time; constant since tumor appeared, at age of thirty-five years. Size four to five inches in diameter. Commenced the use of ergot by the mouth in powder, doses of one grain three times a day. Used much of the time for seven years. Effects good from beginning, checking hemorrhage and lessening size of tumor.

126. B. M. J. Conlin, M. D., Alexandria, Dakota, reports:—

Mrs. J. N., aged forty years; puberty at fourteen years; married at twenty-one years. Four children, aged eighteen, sixteen and fourteen years respectively; one still-born four and a half years ago. Menstruation regular, quite free, little pain, profuse after marriage. Leucorrhœa light, scanty, not constant, profuse about seven years ago. Tumor first noticed in the fall of 1881; about two inches in diameter at present.

First saw patient when called to deliver her of child. She had been in hard labor pains for forty-eight hours; found tumor about six inches in diameter in anterior walls of uterus. Child dead; no help; nearest physician forty-five miles away; pressed back tumor; applied forceps, but could not deliver, as tumor would come in front; wrapped handkerchief around forcep handles, turned woman on knees and face, and pressing back tumor lifted child by tumor; had first passed an exploring needle in tumor. In 1882, S. Bell, M. D., of Beloit, Wis., saw case in consultation, and advised continuance of ergot, Squibb's fluid extract, by mouth, in doses of twenty minims four hours apart; discontinued after four days, then thirty drops three times daily excepting when menstruating, then twenty minims every four hours; continued for three years. At times she would go without any for two weeks. After three days' use good effects appear; now says she is well and discontinued use.

127. Chas. G. Davis, M. D., 240 Wabash Avenue, Chicago, reports:—

Miss L. B., aged forty-nine years; puberty at seventeen; single. Menstruation

regular, profuse, not unusual pain until within the last year. Leucorrhœa thin and slightly ropy, profuse and constant. Tumor first noticed about seven years ago. Uterus seven inches in depth. Abdomen enormously distended, even beyond what one would expect at full term of pregnancy. Administered hypodermically fluid extract of ergot, ten minims daily, continued from November 15th, 1879, to December 1st, then gave twenty minims every alternate day until January 1st, 1880, when slight ergotine symptoms appeared, and discontinued its use for two weeks. From January 15th to February 18th gave ten minims every alternate day, then twenty minims twice a week till April 20th. From September 20th to December 15th, 1880, gave twenty minims three times a week except during two weeks discontinued for severe pain. Tumor had reduced one-fourth in size. February, 1881, menstruation ceased entirely. June 15th to August 20th gave ten minims three times a week, and only a slight fullness could be felt in former location of tumor March 5th. No remaining trace of tumor August 21st, 1887; patient in excellent health.

128. A. H. VINKE, M.D., St. Charles, Missouri, reports:—

Mrs. A. H., aged thirty-six years. Married at twenty-four years. Two children, aged ten and seven years respectively. Had one miscarriage, about three years ago, when first noticed the tumor. Menstruation more or less painful and profuse. Leucorrhœa more or less constant. The tumor is about the size of a fist and grows from the anterior surface of the fundus uteri, dragging the fundus upward between the umbilicus and pubes. During menstrual periods general condition is aggravated; compelled to keep in bed; tumor larger then and causes more pain. She is wearing McIntosh supporter. Have given Fluid Extract of Ergot interruptedly for three years, by the mouth, fifteen to thirty minims three times a day whenever hemorrhage is excessive, which always improves condition, diminishes size of tumor, but as soon as she is better she discontinues until her condition becomes aggravated again.

129. H. M. STARKEY, M.D., 3302 Indiana Ave., Chicago, reports:—

Mrs. E. P. G., aged thirty-one years. Puberty at fourteen years. Married at twenty-eight years. One child; only lived three months. One miscarriage, Sept., 1885. Menstruation always natural before marriage. Flooding has not at any time appeared to be particularly connected with menses. Leucorrhœa only moderate in '85 and '86. Tumor first noticed July, 1885, about three inches in diameter. In August, 1885, commenced the use of fluid extract of ergot, one-half drachm every three hours, and finally used ergotine. Changed to ergotine, two grains, four times a day, combined with quinia, as needed; continued for four months, having seen no hemorrhage for some time before. In two months patient became pregnant, carried child and safely delivered at term. Hemorrhage rather profuse at delivery and for a few days after, but not again troublesome. Tumor was located outside walls of uterus, under peritoneum and growing from upper anterior surface. Drs. Hatfield and Roler saw case; being extra-mural, was not considered favorable for use of ergot.

130. J. H. GREENE, M.D., Marshall, Michigan, reports:—

Mrs. M., aged forty-five years. Puberty at fourteen years. Married at twenty-four years. Has four children, three of whom are living, aged seventeen, fourteen and eleven respectively. Menstruation regular, but for several years excessive, with severe pain. Leucorrhœa thick, creamy, changing from whitish to bloody; profuse most of the time. Menstruation began to be profuse about seven years ago. Tumor first appeared four years ago; two inches in diameter. Fluid extract of ergot, used hypodermically and by the mouth, five minims three times a day, increased to thirty minims four times a day. General health soon began to improve, pain and hemorrhage to diminish. The tumor submucous, attached by a broad surface to the right side, which has been reduced one-half.

131. E. C. Cross, M.D., Rochester, Minnesota, reports:—

Mrs. S. S., a widow, aged forty-four years. Puberty at fourteen years. Married at nineteen years. Had two children, aged sixteen and fourteen years respectively. One miscarriage in 1879. Menses normal in all respects up to 1879. Menstruation and leucorrhœa began to be profuse immediately after miscarriage, at the age of thirty-six years, when the tumor first appeared, the supposed cause being the use of a catheter for the purpose of producing criminal abortion. In the fall of 1880 commenced using Parke, Davis & Co.'s fluid extract of ergot, by the mouth, doses of ten drops three times a day, increased to thirty minims three times daily. After about one month it was reduced, on account of pain in uterus, caused by contraction. Good effects commenced within a few weeks.

132. J. P. Thomas, M. D., Cottage Lawn, Ky., reports:—*

Case I.—J. C.; colored; aged thirty; mother of three children; came to me stating that she was "a great sufferer from falling of the womb;" that the downward pressure was so great that she was unable to keep upon her feet for more than a few hours at a time; that when lying down she did not suffer; that she "had been treated by two physicians for nearly a year;" that she "had worn some kind of support inside of her, but that it only made her sore, etc." A vaginal examination confirmed the diagnosis of her physicians as to the prolapsed condition of the uterus, as the os was nearly protruding from the vulva. Finding it difficult, from its great weight, to replace, a careful examination of the belly by palpation was made, and a hard, unyielding tumor was discovered, apparently nearly as large as a cocoanut, seemingly attached to the fundus uteri and imbedded in the uterine tissue. It extended an inch above the umbilicus when the uterus was in complete prolapse, and on lifting the latter upward, by the introduction of the four fingers, to about its natural position, the tumor could be felt to rise with it until it impinged upon the stomach.

*Diagnosis.*—Fibroid tumor growing from the fundus uteri.

She was placed upon the normal liquid ergot, in teaspoonful doses three times a day, and iodide of potassium in ten-grain doses three times a day, gradually increasing the latter, until she is at present taking ninety grains per day. On the first of October the tumor was hardly perceptible, by careful palpation, through the relaxed and rather thin abdominal walls. I am sure it is not much larger than a hen's egg. The woman has increased in flesh, is as active as she ever was, can remain upon her feet as in health, and her skin is black and glossy. August 18th, 1886. Tumor has entirely disappeared and patient in good health.

133. Case II.—Is a second case of intra-uterine fibroid, in a negro, reduced to extreme anæmia from robust health, by excessive and almost constant hemorrhages, because she had persistently refused an examination, but had taken ergot continuously for over a year, for the purpose of arresting the hemorrhage produced by the presence of the tumor. It was, of course, only of temporary benefit, and only checked the hemorrhage, at best, for a few days at a time, but perhaps prolonged her life. Finally, after nearly losing her life by a profuse flow of blood that required the tampon to arrest, she consented to any operation necessary to remove the cause of her trouble.

A vaginal examination revealed a firm body already distending and occupying the cervix. Being chloroformed, a Sims' speculum was introduced, with the woman in Sims' position, but with only her husband, an ignorant negro, as my assistant. I proceeded to try to remove it by enucleation, as it was, to my surprise and gratification, protruding into the vagina. With considerable difficulty I succeeded in forcing my

* Read before the Christian County Medical Society, at Cottage Lawn, Ky., October 14th, 1886. (See *Progress*, December, 1886.)

index finger between the tumor and cervical wall, and by running it around the tumor, finally dilated the cervix sufficiently to ascertain that the posterior portion of the tumor was still, apparently, imbedded in the lower segment of the uterus. After much and difficult manipulation, I succeeded in literally digging it out with my finger, when, grasping with a pair of dressing forceps, I drew it into the vagina, but found it attached to what seemed to be blood vessels that entered the tumor. Fearing this to be the case, and to prevent hemorrhage, a loop of small wire was passed over the pedicle and twisted, when, with a pair of curved scissors this apparent pedicle was severed, and the round, hard tumor, of dense, white, fibrous tissue I now show you was removed. You will perceive it had no pedicle, in fact, but is perfectly round, smooth, and so solid and compact in structure as to impress one with the idea that it had no blood vessels, but was nourished entirely by capillary circulation; therefore, the seeming pedicle, I opine, was only the ruptured and still adherent mucous membrane.

Though there was no absorption of this tumor from the action of the ergot, yet it teaches us the lesson that the continued action of the drug upon the muscular fibres of the uterus will, in some cases, accomplish what we cannot with the knife—force a submural tumor from its bed beneath the mucous membrane, and even expel it from the uterus. The patient had no more hemorrhage, and, under tonics, rapidly regained her strength, and at present weighs one hundred and eighty pounds.

134. CASE III.—Mrs. L. T., white, aged twenty-nine; puberty at fourteen; married at seventeen years. Three children, aged seven, five and three years. Menses regular, after ten months' nursing child, until tumor was discovered, without pain. Leucorrhœa slight, not constant. Tumor noticed in March, 1887, about the size of a fœtal head fifth month. Commenced use of ergot in June, 1887, by the mouth; dose one drachm three times a day. No appearance of menses, tumor decreasing in size.

135. H. H. WILCOX, M. D., Albert Lee, Minn., reports:—*

CASE I.—Mrs. M. E. W., aged thirty-four years; puberty at thirteen years; married at twenty-two years. Three children, twins aged nine and one aged eleven years. Menses regular, normal. In fall of '76 tumor first noticed. Size one and one-quarter inches when began fluid extract of ergot by the mouth, in one-half drachm doses, often enough to control hemorrhage, which occurred about menstrual period. On examination, found a small conical tumor high up in the cervix, which, when pressed upon, would seem to recede back into the uterine cavity. Hemorrhage was controlled in a short time. Patient then seemed to get well, and was not troubled any more till the last part of June, 1887, when excessive hemorrhage again set in. Use of ergot resumed in one-half drachm doses often enough to control bleeding, kept up for one week, then from uterine contraction a tumor about the size of hen's egg was expelled and hemorrhage ceased and does not recur.

136. CASE II.—Mrs. P. L., aged thirty-three; puberty at fifteen; married at seventeen years. One child, aged fourteen. Two miscarriages, at five and seven months, in 1875 and 1876, caused by heavy work. Menses regular, normal; began to be profuse in 1882. Tumor first appeared in April, 1883, size one and one-half inches in diameter. In April, 1883, this lady had what her physician called a polypus taken from the cervix by sections. He claimed it was one and one-half inches in diameter. The patient did not recover, but had at each menstrual period much hemorrhage, and between them much leucorrhœa, almost amounting to blood. This condition of things kept up until early in April, 1884, when I was called; found her prostrated from loss of blood, so that an examination was not made. But next day, after the administration of fluid extract of ergot and stimulants, I made an examination per speculum, and

* Reported in *Transactions* Minnesota State Medical Society, 1886, page 161.

found a fibroid tumor about two and a half inches in diameter; this being the second growth, I used considerable ergot the week previous to the removal of the tumor, which controlled hemorrhage, so that no blood was lost at operation. The spoon saw, however, contributed largely to the non-loss of blood. After removal she made a good recovery.

137. E. A. HELM, M. D., 2459 Wentworth Avenue, Chicago, Ill., reports:—

Mrs. J. A. M., aged thirty-two; puberty at fourteen; married four years. "Had noticed hard lumps in her abdomen before marriage." Saw her first during first labor, March 25th, 1884. Labor very tedious; breech presentation. Dr. Daniel T. Nelson was called in consultation and aided in delivering a still-born child. There were three tumors, one subserous, the larger five or six inches in diameter, and two interstitial, size of a hen's egg. By the advice of Dr. Nelson, she was put upon twenty-minim doses of fluid extract of ergot four times a day, but this disturbing the stomach, pills of ergotine, gr. iij, were given instead. Ten days after delivery the larger tumor measured four and a half inches in transverse diameter by three and a half inches vertical diameter, with a rather broad pedicle. The ergotine pills did not disturb the stomach, and were continued for some two months, when they were omitted, as the patient felt so well and the tumors caused no annoyance. October 26th, 1884, larger tumor measured three and a half inches in transverse diameter and two and three-quarters inches in vertical diameter. No record of size of the interstitial tumors. Second child born two years ago. Tumors increased in size during pregnancy, but never as large as before. Child lived. Not a difficult labor; moderate flooding. Nursed child seventeen months. Menses absent about a year. Used ergot some three months after birth of second child. Third child born August 20th, 1887; attended by a midwife. Quick, easy labor, some pains only lasting about half an hour. Placenta came away readily; no flooding after. Subserous tumor one and a half inches transverse by one inch in vertical diameter. Interstitial tumors cannot be detected by bimanual examination.

138. EDWARD L. BAKER, M. D., Indianola, Iowa, reports:—

Was called to see Mrs. G. some nine years ago, in the absence of her family physician, on account of severe uterine hemorrhage.

Her age was forty-two. Upon digital examination could feel a tumor, but a thorough examination was not made. Was called again April 26th, 1882, to relieve severe hemorrhage. Did not again see the case till December 13th, 1886; was called in the night, on account of severe pain and bearing down, and, as her husband expressed it, she says "It feels just like a child's head pressing down just before coming into the world." I found on this visit that the tumor had greatly enlarged and pressed quite firmly upon the perineum in the sitting posture. Consultation and a thorough examination were insisted upon and granted. On February 7th, 1887, with the assistance of Dr. J. D. McCleary, we made a careful examination. Her age was fifty-one; married. Had had nine children, thirty-two to eleven years old. Had no miscarriage; menses regular, but continued about a week, while before treatment continued flowing nearly all the time. Now nearly natural in quantity. First hemorrhage occurred when I was first called. When hemorrhages occurred there seemed to be no relation between them and the menses as to time—would occur at any time. We placed patient under influence of chloroform, and, in Sims' position, made an examination. Found a tumor occupying pelvic cavity and extending as high as within two inches of umbilicus; its centre being a little to the right of the median line; could not outline uterus nor obtain view of or touch uterine neck with finger, and were unable to engage sound in uterine os by passing same around tumor and endeavoring to enter os "by feel."

We diagnosed submucous fibroid and placed her on ergot four times a day (thirty-drop doses). The ergot has controlled the hemorrhages but has not as yet diminished the size of the tumor, though it seems to be drawn up from the pelvic floor since its

use; so that she does not suffer from its pressure on the perineum, as she did in June last. She has used thirty-minim doses of normal liquid ergot three or four times a day since February last. When ergot was first commenced, appetite was poor and food distressed. After its use, appetite markedly increased and no distress from food.

139. J. E. DeWolf, M.D., Englewood, Ill., reports :—

Mrs. S. B., aged forty-two and one-half years. Puberty at twelve years. Married at twenty-five years. Three children, aged seventeen, fifteen and thirteen years respectively. One miscarriage, twelve years ago. Menses quite regular, normal; profuse since tumor appeared. Leucorrhœa for some months, thick and brown; quite profuse. Tumor, interstitial, first noticed about fifteen months ago; eight or ten inches in diameter Has used Squibb's fluid extract of ergot continually since April, by the mouth ten minims, three times a day, gradually increased after a month, one-quarter teaspoonful, with occasional nausea. Three months ago good effects, less profuse flooding. No special change in tumor. Menstruation less painful and now normal quantity. Patient feels very weak.

140. Daniel T. Nelson, M.D., 2400 Indiana Ave., Chicago, Ill., reports :—

Case I.—Mrs. M. P., servant, aged twenty years. Puberty at thirteen years. Irish; married eighteen months since, but not living with husband now. One child, ten months. No miscarriage. Noticed tumor in right side a year ago, while pregnant. Had a soreness inside before marriage. No tumor noticed. Size of child's head four months ago; has been growing rapidly since. Menses regular, profuse; continuing nine days at times, usually four or five days. Local examination revealed a large tumor in the anterior wall of the uterus, enlarging it to the size of full-term pregnancy, but the uterine canal measured but three and one-half inches. No abdominal measurements made at first visit. Diagnosis: Large subserous fibroid tumor, probably unilocular.

*Treatment.*—Squibb's fluid extract of ergot, one-half drachm, three times a day. April 25th, 1883. Girth at umbilicus thirty-one inches; two inches below, thirty-three inches. Fluid extract of ergot (rye) changed to fluid extract ustilago maidis (corn), one drachm four times a day, as the rye ergot disturbed the stomach. July 12th, 1883. Tumor seems not to have increased in size. Menses now last six days. September 7th, 1883. Teaspoonful four times a day makes head dizzy, so uses but half-teaspoonful four times a day. October 11th, 1883. Flows six days but does not lose more than half as much blood as formerly. Has taken one and one-half pounds of fluid extract ustilago maidis since began. January 3d, 1884. Flows four days, but not as much in a day. Has used since last visit one and one-half pounds corn ergot, using teaspoonful three times a day, and does not disturb stomach or head. October 14th, 1884. Since last visit has used three pounds corn ergot. Last three months used only a teaspoonful twice a day.

April 16th, 1885. Has used thirteen pounds of corn ergot in all, and two ounces of rye ergot before she began to use ustilago maidis. Menses at last period continued five days and more than recently. Past four months has used one teaspoonful three times a day. Measurements: Umbilicus, twenty-nine and one-quarter inches; two inches below, thirty and one-half inches. Uterus, size at five-months' pregnancy. Patient left the city, having been divorced from her husband, and have not been able to hear from her since.

141. Case II.—Miss L. K., age forty-three. Unmarried. Weight one hundred and twenty pounds. Was first called in December, 1879. Found her flowing excessively, in intense pain, often like labor pains. Stopped flow by introducing a laminaria tent and the pain by opiates. Relieved the pressure upon the rectum and bladder by pushing the tumor upward in the knee-chest position, at the suggestion of Dr. Wm. H. Byford, who saw patient in consultation. Uterus size of seven-months' pregnancy. Diagnosis: Subserous fibroid, involving the whole thickness of the uterine wall.

*Treatment.*—McK. and R. three-grain ergotine pills, one three times a day, increasing gradually, taking most at menses, if excessive, and by rectum in fluid extract when stomach would not retain it. September 4th, 1882. Has used 3000 pills to date. Tumor some larger in left ovarian region. Has not used as many pills recently. February 19th, 1884. Has used 4000 pills. Last summer did not use for some three months. Stomach would reject them, and has used irregularly since. Menses continue one week, free for three days. Weight 145 pounds. General health good. No leucorrhœa. Has used nine pills a day for three weeks, at times. Need not use as many pills, simply enough to prevent the tumor enlarging. October 5th, 1884. Is flowing more; increased pain and tenderness. During July, August, and September had not taken ergot regularly. Menses greatly increased. To resume pills regularly, taking six a day.

May 12th, 1885. Has continued the pills regularly, six daily. Since last visit has used 6000 pills to date. General health good, past winter. Tumor smaller than before; size fœtal head. Menses every three or four weeks, lasting six days, and not very free. April 10th, 1887. She writes: "I have changed my name since I saw you last. Am married, and have been so well most of the time and growing smaller, that I thought I would wait longer and surprise you with the great improvement I had made in the last two years." "In that time I have been very comfortable, with two exceptions; had two slight hemorrhages, only had to keep my bed four days. Took as high as thirteen pills a day, and used fluid extract by rectum twice. I take six pills every day. Am now using my 89th bottle of pills. (They are put up in bottles of 100 pills each.) My color is good, appetite and digestion both good."

August 23d, 1887, she writes; "Have taken, up to the present time, 9200 pills. Am feeling pretty well; had a comfortable time last month." The following extract from a letter of McKesson & Robbins, Wholesale Druggists and Manufacturing Chemists, New York, August 25th, 1887, will be of interest:—

"Our purified ergotine, which is prepared especially for hypodermic use, and which is the same as is used in our ergotine pills, is made of such strength that one grain represents ten grains of best selected ergot of rye."

Miss L. K., then, has taken 9200 three-grain ergotine pills during the last eight years, with a few ounces of fluid extract by rectum and by mouth before using pills, making a grand total of more than thirty-six pounds of best ergot.

142. Case III.*—Mrs. P. K., age thirty-four; puberty at fourteen; married eleven years; has had four children, ages from thirteen to eight years; first pregnancy a dead child, at seven months; three miscarriages at about three months, before the birth of last child; one miscarriage at five months, since the birth of last child. Menses regular before marriage, after every four weeks, but lasting a week; pain excessive; confined to bed; profuse leucorrhœa during the interval of menses. Weighed before marriage one hundred and sixty-five pounds. After a six weeks' miscarriage, before last child, took a sitz bath, and flowed excessively for a week. Had passed her period two to three weeks, and has flowed excessively at menses ever since. Fœtus said to "have had a sore upon its head where it was attached to the womb;" suffering severely while carrying this child; placenta not adherent. Husband intemperate, but not badly so at that time; has been recently; menses regular while nursing, and flowed some while pregnant; not as much while pregnant as when nursing. Nursed first child seven months, second child five or six months; was nursing or pregnant all the time." After fourth child she had child-bed fever, lasting six weeks, but nursed her babe for months. After third child, did well, having no fever or other complication. After one miscarriage she had puerperal fever for three months. Seven or eight months

* Reported to the Chicago Gynæcological Society, April 18th, 1884.

after her fourth child, had a miscarriage, at five months; nursed fourth child four months. Since her last miscarriage she has flowed excessively, and dates all her trouble from that time. Some four or five months later, Nov. 7th, 1879, she went to the Woman's Hospital, of Chicago. When her third child was five days old she had an attack of diarrhœa, which has continued from time to time since. On admission to hospital, uterus retroverted, cervix pointing upward, perimetritis; no local application to uterus, on account of tenderness. Hot-water douche directed morning and night, and the fluid extract of ergot, in half-teaspoonful doses, three times daily. No ergot used from February, 1877, until entrance to hospital, except, perhaps, some two ounces of the fluid extract. Dec. 1st, 1879, applied a mixture of iodine and carbolic acid to cervix; uterus measuring three inches in depth after menstruation; ergot continued. January 9th, 1880. No local applications were made during this time, as this application gave pain; ergot continued; uterus 2½ inches in depth. February 4th, a tender body behind the uterus from the left, supposed to be a displaced ovary. March 1st, ergot continued, giving pain in region of the uterus; continued ergot as much as can be borne. April 26th, same record. Was discharged from the hospital and lost sight of for the time, but continued the ergot. Sept. 29th, 1881; she has taken, up to this date, in all, eight pints of the fluid extract of ergot, and 600 three-grain pills Squibb's solid extract of ergot, and 100 of McKesson & Robbins' three-grain ergotine pills. March 25th, 1882, 300 more of McKesson & Robbins' three-grain pills. Nov. 10th, 1883, has taken no ergot during the past six months; uterus seven inches in depth. Ergotine pills resumed, and continued, with more or less regularity, until April 9th, 1884, taking, during this time, 800 more McKesson & Robbins' three-grain pills, making a total of 1800 three-grain ergotine pills, and eight pints of Squibb's fluid extract of ergot taken since November 7th, 1879, and the greater part since April 26th, 1880, and all of the pills since that date. On Wednesday, the 9th of April, 1884, she passed a fibroid tumor, five inches in diameter, and another on Thursday morning, two inches in diameter, and the third and smallest one on Friday afternoon, about one inch in diameter.

The case is of interest in considering the origin of fibroid tumors, as there certainly was here congestion of the uterus during a long series of years. The large amount of ergot used, without poisonous results, will also be noted. The absence of septic poisoning in the case is remarkable, as there were, excepting during the first days, no bad odors from the discharges from the uterus, and after the masses were passed, all discharges ceased. At its greatest development, when the uterus measured seven inches in depth, internally, it reached the umbilicus externally. The question of syphilitic origin of the masses was considered, but Dr. J. G. Berry, who kindly assisted in the care of the case, and has treated the family at different times, has not been able to detect any evidence of syphilitic disease, either in the patient, her husband or the children. The time when these masses originated is a point of considerable interest. Fibroid degeneration was suspected while in the hospital, but on Jan. 9th, 1880, when the examination seemed to show the depth of the uterus to be only 2½ inches, it was thought either there was no fibroid in the uterus, in the first place, or it had been absorbed.

Have these masses which were expelled developed since that date, or were they present years before, and their growth checked temporarily only by the use of ergot, previous to January 9th, but not entirely obliterated?

143. Case iv.—First called to see Mrs. J. P. May 1st, 1884. Found her extremely prostrated from excessive hemorrhage, unable to rise from bed, unable to retain any food, suffering from severe neuralgia in a large tumor in abdomen. Said she always flowed excessively at menstrual periods; supposed "change of life." She was born in Canada. A sister had a tumor, also. Married twice; lived with first husband seven

years. Widow six years; with her second husband four years. Never pregnant. Had a tumor some eighteen years; so it began a year or more before first marriage. Had flowed excessively from puberty. Was careless, often taking cold.

Examination revealed an enormously distended abdomen, containing considerable ascitic fluid and a fibroid tumor on the anterior wall of the uterus, enlarging that organ to size much greater than full-term gravid uterus. The abdominal walls and the lower limbs were so œdematous as to forbid walking, had she the strength. Attempts at sitting up in bed produced faintness. Quinia soon relieved the periodic neuralgia in tumor. Was never able to introduce uterine sound or probe uterus over three and one-half inches. Diagnosis: Enormous subperitoneal fibroid. Began treatment by giving McKesson & Robbins' three-grain ergotine pills, one three times a day, increased soon to four daily. This dose was continued till Aug. 25th, 1884, when it was increased to six pills a day. Sept. 27th, 1884, increased to eight pills daily. March 29th, 1885, has taken 10 to 12 pills daily past three months, having taken 1775 pills to date. Dec. 26th, 1885, has used 3000 pills to date, taking usually 8 pills daily, but has used as many as 18 pills a day when flowing severely, as "menses." Tumor much smaller, about two-thirds former size. Attends to her household duties; only takes her bed a day or two at "menses." The ascites and œdema in lower extremities soon disappeared after beginning treatment. Has improved in color and strength greatly. Until the present time she has been in no condition to risk a surgical operation, neither would she consent to have it now, and it hardly seems wise to urge it while she is doing so well.

She died of exhaustion, June 9th, 1886, aged forty-four. During the later months of her life an almost constant discharge of serous fluid from the vagina, compelling use of napkins, gradually reduced her strength, though she took but little note of it, as it was only slightly tinged with blood. Called June, 1886; found greatly reduced from diarrhœa, which had been troubling her a week before. This, with the serous discharge, had prostrated her until she was as weak and anæmic as when I first saw her, but there was not as much ascites or œdema. Though she rallied somewhat at times, she gradually sank and died. She had used over 4000 three-grain pills from May 12th, 1884, to June 9th, 1886. We never saw anything but good effects from them. She asserted, and I believe, they prolonged her life nearly two years.

144. Case v.—Mrs. C. R., age forty-one. Puberty at fourteen. Married at twenty-two. One child, lived five months, four years after marriage. No miscarriage. A slow getting-up and no milk from the first. Since puberty, menses always regular every 22 to 25 days, continuing six to seven days; very profuse and with intense pain first two days; some leucorrhœa about menses. Menses always attended with nausea and vomiting, pain in the back and soreness over the abdomen, so that even the weight of the hands or arms would hurt. After childbirth flowed seven weeks; had a rest of three, and the menses returned, with the same intense suffering as before, and continued till she entered the Woman's Hospital, Jan., '82. When first married, passed what a physician called a polypus, size of a finger and two inches in length; "looked like solid flesh." Was at Woman's Hospital, Chicago, from Jan., '82, to Sept., '82. While in hospital, began with fluid extract of ergot, 20 minims three times a day, and increased gradually until 150 minims four times a day were used, which amount continued for three weeks. March 17th, 1882, tumor size of fœtal head. From March 24th to Sept. 17th, '83, took three and one-half pounds corn ergot. March 22d, '83, do not find anterior tumor. Posterior tumor size of English walnut, greatly flattened. On Sept. 17th, 1883, do not find anterior tumor. In place of posterior not sure there is more than inflammatory adhesions. April 23d, '84, uterus more movable, tumor or cicatricial tissues at its former site—size of an English walnut, much flattened. No ergot since Oct. '83. April 2, '85, has had a sore spot under left clavicle and a hacking cough for some time, though it has been better past two years than for some time. Had pleurisy in right side five years since; in bed

a week. Took cold in Feb., '85; had cough and pain in left lung, but not below mammary gland. Spit blood in March, '85, several ounces; not since. Menses normal, three or four days every four weeks. Hæmoptysis at time of menses. Formerly flowed a week to ten days and very profusely. Since last October able to do light housework and can walk a mile. No ergot since Oct., '83. Do not find any remains of tumors. Uterus retroverted and adherent, but more movable than at last visit. Dr. Wm. H. Byford kindly examined patient, and could not detect any remains of the tumors. Went to Colorado in '85, for disease of lungs, and has resided there since. She writes me, March 22d, '87, "Am regular every 24 or 25 days; sometimes suffer considerable, at others not any. Flow about four days and not enough to ever feel weakened by it; appetite good."

145. CASE VI.—July 20th, 1882. Mrs. G. W., aged thirty-eight; puberty at thirteen years. Married 1½ years; never pregnant. Menses continued a year at thirteen, and then stopped a year. After their return, came every three weeks. Was a teacher about eleven years before marriage. Bearing-down pain in ovarian region. Appetite good, bowels constipated or too loose. Headache one day during menses, usually second or third. Menses every three weeks, free, lasting five days, pain first twenty-four to thirty-six hours. Thick, white leucorrhœa, not large in amount or constant. Standing and walking produce backache.

*Diagnosis.*—Tumor in anterior uterine wall. Interstitial, but located near the junction of the cervix with the fundus, and reaches the uterine canal; tortuous. Size, 1½ by 1 inch in diameter. Uterine canal, 3¾ inches.

*Treatment.*—3-grain ergotine pills three times a day, increased. August 14th. Elm bougie, to dilate cervix; continue pills. October 7th. Tumor much smaller; increased ergotine, but did not disturb the stomach. November 23d. Has used four hundred pills. Menstrual interval now 26 days. Is much better in every way. December 20th. Used 500 pills. Uterine canal 3¼ inches in depth. Tumor smaller; menses half as much as formerly. Headache much reduced. March 30th, 1883. Tumor hardly to be found; increased pills to six or eight daily. Stopped using pills in August or September, 1884, after using 1500.

146. CASE VII.—Mrs. C. R. H., aged forty-six; puberty at sixteen; married at twenty; never pregnant. Had menses at puberty once or twice and stopped four months, then returned and flowed excessively for six months, continuing a week. Have been profuse since. Leucorrhœa never profuse. Eleven years ago treated for a time for uterine disease. In April, 1884, made examination and found a large subperitoneal fibroid growing from the right anterior wall of the fundus, and a smaller interstitial one growing from the left wall at the junction of the broad ligament. Uterus enlarged to the size of five-months' pregnancy. Began using ergotine pills, gr. iij, one three times a day, and increased to four and six a day. Using most at menses. April 16th, 1885. Larger tumor measures 4 by 2 inches. November 6th, 1886. Has used six pills daily till three months ago, three a day since; tumor not as large or as tender. Is perfectly well, in her opinion, and wishes to leave off the pills as needless. Does not tire readily. Increasing greatly in flesh. Flows much less, and but three days.

June 11th, 1887. Larger tumor 4 by 1½ inches, and smaller tumor one inch in diameter.

Aug. 30th, 1887. Has had visitors during the summer. Last two periods have been more free, though lasting but four days. Directed to take six pills daily again, and keep her bed during menstruation. Has used 3150 pills to date.

147. CASE VIII.—May 23d, 1882. Mrs. K. O., aged twenty-six years; puberty at fourteen; married nine years; no children. Illness began four months ago; had severe pain in right groin, and flowed three weeks. Began ergot.

*Diagnosis.*—Subserous fibroid tumor in right inguinal region and three interstitial

inside uterus. Uterus size seven months' pregnancy. Menstruated every three weeks; profuse for five days. Leucorrhœa. Tumor increasing in size.

*Treatment.*—May 29th. Ergot gtt. xxx, t.i.d. June 1st. Same four times a day. June 8th. Much and severe pain. 12th. Ergot gtt. lxx four times a day. Morphine for pain. July 18. Ergot continued; tumor smaller. 20th. Ergot gtt. lxxx four times a day. 25th. Attack of colitis, lasting six days. 31st. Ergot resumed. August 5th. Examined; tumor one-sixth original size. 15th. Nearly disappeared; general health improved and discharged.

Readmitted to hospital November 9th, 1887, and died December 8th, 1887, with chronic suppurative peritonitis. At the post-mortem large abscesses were found behind the uterus, posterior to the ascending and descending colon, and smaller ones in the folds of the peritoneum among the intestines, but no remains of the tumors could be found. Had used ergot only irregularly after leaving the hospital.

148. Case ix.—Mrs. E. R. H., Chicago, Ill., aged thirty-five; age at puberty twelve years. American. Married two years; no children. Miscarriages, two. Slight indigestion, bowels regular, nervous palpitation on exertion. Menstruation regular, very scant; pain excessive. Leucorrhœa varied from bloody to clear, slightly more after menses. Headache general and very severe, bordering on insanity at menses. Insanity hereditary in family. Sick two years, but from puberty has suffered excessively at menstrual periods, usually three days and nights. No relief whatever from medicines. Sympathetic troubles were catarrhal condition of the stomach and bowels. Lungs thought to be diseased at one time, but change of climate improved physical condition while suffering at menstrual period. Hysterical convulsions, sight and speech gone, consciousness remaining for a short time and then disappearing for a time. Patient could not tell how long these attacks lasted. Before marriage was treated for prolapsus uteri. At time of first miscarriage, December 8th, 1885, ether having been given to remove the products of conception, a small submucous fibroid tumor, one and a half inch by one inch, was found in anterior wall of uterus near cervix. Used pill ergotine, gr. three, three or four times a day until tumor disappeared. During the year 1886 the hystero-epileptic seizures at the menstrual period increased in severity, also the mental disturbances, so that continuing insanity was to be feared, especially as there had been cases in the family. The removal of the ovaries and tubes was recommended, to stop menstruation and the nervous disturbances at that time. I performed the operation at the Woman's Hospital, October 26th, 1886, and she left the hospital December 6th, 1886, greatly improved. At the time of the operation no tumor could be found in the uterus, though, a small subperitoneal tumor, three-quarters of an inch in diameter, was readily seen on the anterior wall, at the fundus.

August 4th, 1887. Menses have not returned since leaving the hospital. No return of tumor.

149. Case x.—March 6th, 1882. Miss L. W., Helena, Ark., aged twenty years; puberty thirteen. Menses normal before fall. At sixteen years of age had a fall down stairs. After, had disturbed menstruation; had menorrhagia and metrorrhagia; flow severe. Pain lasting from 48 to 56 hours. Leucorrhœa between periods profuse. Interstitial fibroid tumor in anterior wall of uterus, one and a half inches in diameter. Treatment, Tr. Iodine, externally. March 14th, began ergot, gtt. xx. t.i.d. 17th, ergot four times a day. 24th, ergot, xxx. t.i.d. April 4th, ergot gtt. x. 4 times a day. 14th. Patient had severe hemorrhage. May 5th. Ergot ʒ ij four times a day. 9th. Ergot discontinued; menstruating; pain severe. 12th. Menstruation ceased; flow less than last time. Same date, ergot resumed. May 18th. Examined tumor; diminished in size. 22d. Hardly perceptible. 27th. Discharged.

150. Case xi.—Mrs. M. O. B. called on me January 26th, 1886, to determine whether she was pregnant or not. Examination showed pregnancy of about two months

complicated with an interstitial fibroid tumor in the anterior uterine wall, an inch and a half in diameter.

February 5th, 1886. She miscarried, and under ether, to remove the products of conception, it was easy to verify the diagnosis of fibroid, as stated above. She was given half-drachm doses of fluid extract of ergot three times a day, to be increased after a time. She continued the ergot till she became pregnant again, when it was stopped. February 7th, 1887. Babe born at full term. While under ether to remove adherent placenta, no remains of fibroid tumor could be detected.

151. AUGUSTUS P. CLARK, M. D., 693 Main Street, Cambridgeport, Mass., reports:—

Mrs. M. S., aged forty; married at twenty years; puberty at thirteen years; has one child aged eighteen years; two miscarriages in 1880 and 1881. Menstruation quite regular, profuse, often severe pain. Leucorrhœa catarrhal, abundant, almost always after menses. Menstruation began to be profuse about 1880. Leucorrhœa in 1882. Tumor first noticed in July, 1882, with an estimated diameter of three inches. Began the use of fluid extract of ergot by the mouth January, 1883, in doses of 15 minims, twice a day, increased to 20 minims after three months. Good effects began to appear after the fourth month; the mass of the tumor has greatly reduced in size. Though the patient still menstruates the flow is inadequate, and as she is nearing menopause it is reasonable to hope that the worst is over, and that the abnormal growth is undergoing a retrograde process which will ultimately work its own cure. Patient considers herself cured.

152. E. BRALLIER, M. D., 217 South Main Street, Chambersburg, Pa., reports:—

CASE I.—Mrs. E. J. B., white, aged thirty-nine years; puberty at seventeen years; married at twenty-three years; six children, aged from fourteen to six years. One miscarriage one year before first confinement and fifteen years ago. Gave birth to twins at second confinement. Menses regular and normal; no pain until three or four months before noticing tumor. Leucorrhœa white; none until about time tumor appeared; none since cured. Tumor first noticed in March, 1884, about two inches in diameter. Some hemorrhage. Ergot given October, 1884; solid extract by the mouth, in doses of one grain, increased to three grains three times a day. Hemorrhage greatly lessened until July, 1885, when the leucorrhœa became excessive and somewhat streaked with blood. One day she passed a hardened substance about the size of a hen's egg, accompanied with a good deal of bloody mucus. From this time the ergot was stopped; tumor became rapidly smaller, menses regular and normal. Leucorrhœa disappeared September 22d, 1887; uterus normal size; patient perfectly well ever since but never pregnant. Tumor entirely disappeared.

153. CASE II.—Mrs. S. J. A., white, aged twenty-five years; puberty at fifteen years; married at nineteen years; has four children, aged one to four years. One miscarriage, February, 1882, at six months' pregnancy. Menstruation regular, normal, and not severe pain until November, 1886, when it began to be profuse. Leucorrhœa white, small amount. Tumor first noticed June, 1886, about size of full-term pregnancy. In November, 1886, began the use of ergot, solid extract by the mouth, in doses of two grains three times a day, increased to three grains three times a day after about two months. The tumor began at the fundus of the uterus and involved the whole body of the organ. With the use of ergot there were no bad effects, her general health became better, and the tumor remained in *statu quo;* before the use of the ergot it grew rapidly. Menses less.

The three following cases are reported as of great interest, though not treated by ergot—the first treated by iodine, the second by muriate of lime, the third, a case of spontaneous expulsion, without medicine. These cases are not included in the summary:—

S. J. RADCLIFFE, M.D., Washington, D. C., reports the following case treated by Iodine :—

I was consulted, Sept. 17th, 1880, by Mrs. F., aged forty years, married, mother of four children, the youngest eight years old. Complexion sallow, figure stout, weight about 150 pounds, general appearance anæmic. She had suffered for over three years from frequent and profuse menstruation ; had always been short of her regular time, the periods occurring often twice in the month, and the flow amounting sometimes to flooding, confining her to her bed from four to six days each time. She first passed large, firm clots, several during the catamenial period that seemed a handful, attended by straining and pain, much like labor-pains, which was followed by an irregular and hemorrhagic flow, inducing a long train of neurasthenic symptoms and greatly impaired health. She had dragging pains of the pelvis and back, had headache, was nervous, had half-sight, palpitation of the heart, irritable bladder and constipation.

September 20th, I made an examination ; found the uterus lower and larger than normal, retroverted, firm to the touch, the external os patulous, admitting the point of the index finger, easily tilted forward, slightly abraded, with some moisture of a leucorrhœal nature at os. The probe passed in 4½ inches, by depressing the point so as to conform to the inequalities of the anterior wall of the organ, which, on palpation, was found to be much thickened. No evidence of cellulitis or other abnormal surroundings was observed.

Some bleeding occurring from the manipulations, I painted the os and cervix, as far as I could penetrate, with compound tincture of iodine, promising to continue it twice a week, and directed the patient to use hot-water vaginal injections daily, the water to be as hot as she could bear.

I applied the iodine on the 23d and on the 27th, menstruation appearing during the week. Sickness in the family prevented my continuing the applications, and they were interrupted for the time.

The menstrual period just passed was much more comfortable; she was sooner over her sickness, had less flow, and felt better. The period in October was completed with comparative ease, the duration of the catamenia was not prolonged, and the amount of the discharge was not excessive. A short time after her last period she met me on the street and said, with evident delight, "I bless you every day for the good you have done me. I am so much better !"

Her period in November, however, was not so fortunate for her. I saw her on the 16th with quite a flow, which continued from day to day to an alarming degree, in spite of every remedy used to arrest it. I gave her large doses of Squibb's fluid extract of ergot, gallic acid, sulphuric acid, acetate of lead and opium, applied cold compresses, kept her head low, until the 21st, when I was prevented from seeing her until the 26th, Dr. Basil Norris kindly visiting her for me. The hemorrhage during this time continued with unabated severity, which not even the tampon and other means employed could control.

In order to ascertain the cause of the hemorrhage and to facilitate local treatment, large sponge-tents were now introduced successively, until the proper dilatation was secured, and on exploration of the uterus by Dr. Norris and myself, by digital examination and the probe, a fibroid tumor was discovered, embedded in the anterior wall, extending from the neck upward toward the fundus, oblong, and as large as a hen's egg. The uterus cervical canal, and vagina were filled with cotton-wool saturated with persulphate of iron, and the hemorrhage ceased.

We visited the patient together until the 27th, at which time, though convalescent, she was still weak, pale, and faint on the least exertion. No bleeding occurred after the effectual plugging of the uterus, and there was no consecutive irritation set up by the necessarily continued manipulation.

Surgical means for her relief was discussed, but nothing definite was determined upon, as her husband was absent from the city, and we thought it advisable that he should be apprised of her condition, so that he might be present in case surgical interference should be required; and further proceedings were postponed indefinitely.

Iodine was also spoken of, but was not considered of much value, as the little benefit it might accomplish was not thought sufficient to compensate for the uncertainty and trouble it would occasion, and serious results might be precipitated by delay.

The patient, however, expressed a wish that I would continue the iodine, as she said she felt better after the two or three applications I had made; and to employ the time, I consented to continue the applications to the uterus twice a week for an indefinite time.

I began the applications January 14th, using Churchill's tincture of iodine, and directed her to take ten to fifteen drops of compound tincture of iodine (U. S. D.), largely diluted, three times daily, and also to continue daily the hot-water vaginal injections.

I continued this treatment until May 12th following—nearly four months—only omitting during the menstrual period, beginning it as soon as the menstrual effort was completed, and discontinuing only when menstruation was apparent.

Nothing occurred during the treatment worthy of special mention. She had no hemorrhage or excessive flow after the commencement of treatment. Her periods became regular and painless, the flow normal in time and quantity, and the record showed such steady improvement in general health that I concluded to make a further examination to see what change had been made after so long a treatment.

May 12th I introduced a large sponge tent, and removed it on the 13th. By digital examination I found to the touch the uterine surface and cervix smooth and even, the uterus reduced in size, and its position good. The probe passed in three inches without obstruction. No trace of the tumor could be found.

Anxious that my conclusions should be verified, I introduced a larger tent, and requested Dr. Basil Norris, who had seen the case with me before, to meet me in consultation the next day, to examine the patient with me again.

Dr. Norris met me as requested, and after removing the tent, the cervical canal being sufficiently dilated to admit the index finger, a careful, painstaking, and thorough exploration was made, and neither of us could find the least vestige of the tumor left, and we had no hesitation in expressing the opinion that it had been entirely absorbed.

June 15th she left the city for one of the Virginia springs, where she remained until September 15th. She wrote me in July that she was well, and had had no return of her troubles, though she walked a good deal, even up to the top of the mountain. When she returned in September her weight was 173 pounds.

She was, of course, approaching the menopause, when naturally most of her troubles would lessen or cease, though not necessarily so; but she has been placed by the treatment in a better condition of health, and will be better able to endure any change that might occur to her at that period which most women rather dread than invite; her mental stamina and nervous energy are stronger, and she is relieved from the annoying reflection that she has a *tumor* which at any time might put her life in jeopardy, either of itself or peradventure by reason of any operation that might have been considered or rendered necessary.

She has kept well to the present time, has been able to perform her usual duties, and has required no further treatment; and I think I am justified in reporting the case as one of those that occasionally occur in practice, where absorption takes place either by natural or by artificial means.

L. C. LANE, M. D., San Francisco, Cal., reports a case treated by muriate of lime :—

A remedy which I rely on more than ergot is the internal use of solution of muriate of lime. (U. S. Dispensatory.) With this agent, I believe you can arrest the growth and, probably, produce calcification of the tumor.

This treatment originated, I think, with Dr. Channing, of Boston. I learned it in 1871, and have been using it since that date. I commence with twelve drops three times a day, and increase the dose day by day, until the quantity equals, or even exceeds, half a teaspoonful three times a day. It should be administered diluted freely with sweetened water.

E. INGALS, M. D., 34 Throop Street, Chicago, Ill., reports a case of spontaneous expulsion :—

Mrs. B., aged thirty years; puberty at fourteen years. Menstruation regular until two years ago; rather profuse and considerable pain. Married at twenty-eight years. No children. Tumor a submucous fibroid of the uterus, of medium size. Patient suffering severe pain, so that large doses of opiates needed. At the same time, gave a prescription for fluid extract of ergot, to be given under certain contingencies, in doses of 20 minims three times a day, but as they did not arise, it was never administered. After a consultation, in which W. H. Byford, M. D., advised an operation, he took charge of the case, and patient was removed to hospital; upon examination found that the walls surrounding the tumor had opened into the cavity of the uterus and the tumor was in process of being expelled. This process of cure, commenced by nature, was completed by the knife.

Aug. 24th, 1887. Dr. Ingals writes: Mrs. B. took no ergot before she entered the hospital, so it is a case of spontaneous expulsion without ergot.

The Tables following present a summary of the preceding cases, comprehensively arranged for ready reference and comparison :—

| Physician's Name. | Case. | Color. | Age. | Age Tumor Noticed. | Married. | Children. | Miscarriages. | Variety of Tumor.* | Length of Treatment. | Result. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Hemorrhages, etc., relieved. | Tumor Smaller. | Tumor Expelled or Absorbed. | Tumor not Affected. | Died from Tumor Directly. | Died from Tumor Indirectly. |
| Pattee | 1 | W. | 75 | 42 | Yes | 2 | 0 | I. | 8 days | 1 | | 1 | | | |
| O'Neal | 2 | W. | 43 | 37 | No | 0 | 0 | ... | ... | ... | 1 | | | | |
| Park | 3 | W. | 44 | 37 | Yes | 0 | 2 | ... | 3 mos. | ... | | 1 | | | |
| Epley | 4 | W. | 45 | 33 | Yes | 0 | 0 | ... | 2 mos | ... | 1 | | | | |
| Bowen | 5 | W. | 44 | 42 | Yes | 4 | 2 | ... | 1 year | 1 | | 1 | | | |
| Adair | 6 | W. | 42 | 36 | Wid. | 1 | 0 | ... | 3 mos. | ... | 1 | | | | |
| Stone | 7 | W. | 43 | 37 | Yes | 3 | 0 | ... | 2 years | ... | | 1 | | | |
| " | 8 | W. | 45 | 37 | Yes | 1 | 1 | ... | 3 days | ... | | 1 | | | |
| Waxham | 9 | W. | 45 | 44 | Yes | Several | 0 | ... | 2 mos. | ... | | 1 | | | |
| Hand | 10 | W. | 19 | ... | Yes | 1 | 1 | ... | 2 years | ... | 1 | | | | |
| " | 11 | W. | 47 | 36 | Yes | 0 | 0 | ... | ... | ... | 1 | | | | |
| Wilson | 12 | C. | 49 | 38 | Yes | 4 | 0 | ... | 8 mos. | ... | | | | 1 | |
| " | 13 | W. | 62 | 48 | Yes | 3 | 0 | ... | 1 year | ... | | | | 1 | |
| Strong | 14 | W. | 34 | 33 | Yes | 1 | 1 | I. | 18 mos. | 1 | | 1 | | | |
| " | 15 | W. | 46 | 42 | Yes | ... | ... | I. | 2 years | 1 | | 1 | | | |
| Antony | 16 | W. | 34 | 28 | No | 0 | 0 | ... | 2 mos. | ... | | | | 1 | |
| " | 17 | W. | 35 | 28 | Yes | 1 | 0 | ... | 6 mos. | ... | 1 | | | | |
| McLaughlin | 18 | C. | 40 | 21 | Yes | 1 | 0 | I. | 12 mos. | | 1 | | | | |
| " | 19 | C. | 35 | 35 | No | 0 | 0 | ... | ... | | 1 | | | | |
| " | 20 | W. | 25 | ... | No | 0 | 0 | S. | 3 mos. | | 1 | | | | |
| Newman | 21 | W. | 40 | ... | Yes | 0 | 0 | S. | 1 year | ... | 1 | | | | |
| " | 22 | W. | ... | ... | ... | 3 | 0 | I. | 3 mos. | ... | | | | 1 | |
| Crouse | 23 | W. | 33 | 29 | Yes | ... | ... | ... | 8 mos. | | 1 | | | | |
| " | 24 | W. | ... | ... | Yes | ... | ... | ... | 4 mos. | | | 1 | | | |
| " | 25 | W. | 43 | ... | Yes | ... | ... | ... | 1 year | 1 | | | | | |
| Cheney | 26 | W. | 30 | ... | No | 0 | 0 | I. | ... | 1 | | 1 | | | |
| Henry | 27 | W. | 40 | ... | Yes | 0 | 0 | ... | ... | 1 | | 1 | | | |
| Eliott | 28 | W. | 43 | 36 | Yes | 7 | 0 | S. | 3 mos. | ... | | 1 | | | |
| Pritchett | 29 | W. | 46 | 39 | Yes | 0 | 0 | ... | 3 mos. | | | | | 1 | |
| Harrington | 30 | W. | 24 | 11 | No | 0 | 0 | ... | 4 mos. | ... | | 1 | | | |
| Patee | 31 | W. | 40 | 26 | Yes | 2 | 1 | ... | 3 years | ... | | 1 | | | |
| Felker | 32 | W. | 43 | 40 | Yes | 0 | 0 | ... | 4 mos. | ... | | 1 | | | |
| " | 33 | W. | 55 | 43 | Yes | 0 | 0 | ... | 3 mos. | ... | | 1 | | | |
| Talley | 34 | W. | 38 | 32 | No | 0 | 0 | ... | 9 mos. | ... | | 1 | | | |
| Musser | 35 | W. | 43 | 36 | No | 0 | 0 | S. | 3 mos. | ... | 1 | | | | |
| Brechin | 36 | W. | 34 | 31 | Yes | 0 | 0 | ... | 1 mo. | ... | 1 | | | | |
| Reagan | 37 | W. | 54 | 54 | No | 0 | 0 | ... | 1 mo. | ... | | 1 | | | |
| " | 38 | W. | 43 | 26 | Yes | 4 | 2 | ... | 8 days | ... | | 1 | | | |
| Guhman | 39 | W. | 30 | ... | Yes | 0 | 0 | ... | 4 mos. | ... | | 1 | | | |
| Carpenter | 40 | W. | 41 | 40 | Yes | 3 | 0 | M. | 2½ mos. | 1 | | 1 | | | |
| Paine | 41 | W. | 43 | 41 | No | 0 | 0 | S. | 11 mos. | 1 | 1 | | | | |
| Eastman | 42 | W. | 42 | 40 | Yes | 1 | 1 | I. | 8 mos. | 1 | | 1 | | | |
| " | 43 | W. | 43 | 42 | Yes | 11 | 1 | M. | 1 mo. | | | 1 | | | |
| Waell | 44 | W. | 50 | 36 | Yes | Several | ... | ... | ... | | 1 | | | | |
| Beale | 45 | W. | 40 | 34 | No | 0 | 0 | ... | 2 years | ... | 1 | | | | |
| Lay | 46 | W. | 71 | 44 | Yes | 2 | 1 | I. | 10 years | ... | | 1 | | | |
| Wyman | 47 | W. | 41 | 34 | Yes | 0 | 0 | ... | 7 years | 1 | 1 | | | | |
| McArthur | 48 | W. | 31 | 28½ | Yes | 0 | 0 | ... | 3 years | ... | | 1 | | | |
| Parkes | 49 | W. | 43 | ... | Wid. | 3 | 0 | M. | 6 mos. | | | 1 | | | |
| " | 50 | W. | 37 | ... | Yes | 5 | 0 | M. | ... | | | 1 | | | |
| " | 51 | W. | 33 | ... | Yes | 3 | 1 | ... | ... | | | 1 | | | |
| " | 52 | W. | 34 | 32 | Yes | ... | ... | ... | ... | | | 1 | | | |
| Schneck | 53 | W. | 50 | 40 | Yes | 0 | 0 | ... | 2 mos. | | | | | | 1 |
| " | 54 | W. | ... | ... | Yes | 3 | 0 | I. | 18 mos. | ... | | 1 | | | |
| Cooper | 55 | W. | 55 | 47 | Yes | 2 | 0 | ... | 3 years | ... | 1 | | | | |
| Bontecou | 56 | W. | 37 | 34 | Yes | 1 | 0 | S. | 1 mo. | | 1 | | | | |
| " | 57 | W. | 27 | 27 | No | 0 | 0 | S. | ... | | 1 | | | | |
| " | 58 | W. | 30 | 27 | Yes | 1 | 0 | ... | 3 mos. | | 1 | | | | |
| Lichty | 59 | W. | 43 | ... | Yes | 2 | 0 | M. | 3 mos. | ... | | 1 | | | 1 |
| Smart | 60 | W. | 43 | 36 | Yes | 3 | 0 | ... | 2 years | ... | | 1 | | | |
| Richardson | 61 | W. | 56 | 45 | Yes | 10 | 0 | ... | 1 year | 1 | | 1 | | | |
| Shroffer | 62 | W. | 50 | 44 | Yes | 6 | 0 | ... | ... | 1 | | 1 | | | |
| Johnson | 63 | W. | 30 | 28 | No | 0 | 0 | ... | 6 mos. | 1 | 1 | | | | |
| " | 64 | W. | 40 | ... | ... | ... | ... | ... | 2 weeks | 1 | 1 | | | | |
| " | 65 | W. | ... | ... | ... | ... | ... | ... | ... | | 1 | | | | |
| Thompson | 66 | W. | 35 | ... | Yes | 0 | 0 | S. | 2 mos. | ... | 1 | | | | |
| Leadenham | 67 | W. | 38 | 34 | Yes | 0 | 0 | ... | 4 years | ... | 1 | | | | |
| Dwyer | 68 | W. | 30 | 30 | No | 0 | 0 | ... | 9 mos. | ... | 1 | 1 | | | |
| Drayer | 69 | W. | 36 | 33 | Yes | 5 | 2 | ... | 18 mos. | | | 1 | | | |

*S.—Submucous. M.—Mucous. I.—Interstitial.

| Physician's Name. | Case. | Color. | Age. | Age Tumor Noticed. | Married. | Children. | Miscarriages. | Variety of Tumor.* | Length of Treatment. | Result. Hemorrhages, etc., Relieved. | Tumor Smaller. | Tumor Expelled or Absorbed | Tumor not Affected. | Died from Tumor Directly. | Died from Tumor Indirectly. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Drayer | 70 | W. | 44 | 44 | Yes | 2 | 2 | ... | 2 years | 1 | 1 | | | | |
| Wessinger | 71 | W. | 28 | 27 | Yes | 5 | 0 | ... | 1 year | ... | | 1 | | | |
| " | 72 | W. | 35 | 30 | Yes | 0 | 0 | ... | 5 years | | 1 | | | | |
| Cushman | 73 | W. | 43 | 43 | Yes | 4 | 10 | ... | 6 mos. | ... | 1 | | | | |
| Fenn | 74 | W. | 51 | 36 | No | 0 | 0 | ... | 7 years | ... | 1 | | | | |
| Wingate | 75 | W. | 39 | ... | Yes | 0 | 0 | ... | ... | 1 | | 1 | | | |
| Thomson | 76 | W. | 38 | 37 | Yes | 1 | 0 | ... | 7 mos. | ... | | 1 | | | |
| Houston | 77 | W. | 32 | 32 | Yes | 4 | 0 | ... | 8 mos. | ... | | 1 | | | |
| Kessler | 78 | W. | 38 | ... | Yes | ... | 1 | M. | 6 mos. | 1 | 1 | | | | |
| " | 79 | W. | 37 | 20 | Yes | ... | 1 | I. | 6 mos. | 1 | | 1 | | | 1 |
| Ensign | 80 | W. | 31 | 28 | Yes | 5 | 2 | M. | 6 mos. | ... | | 1 | | | |
| Stewart | 81 | W. | 45 | 37 | No | 0 | 0 | ... | 7 years | ... | | 1 | | | |
| Wheeler | 82 | W. | 42 | 37 | Yes | 0 | 0 | I. | ... | ... | 1 | | | | |
| Hawes | 83 | W. | ... | ... | Yes | 2 | 0 | M. | 1 year | ... | | 1 | | | |
| Weston | 84 | W. | 20 | ... | Yes | 0 | 0 | ... | 6 mos. | ... | | 1 | | | |
| Duffield | 85 | W. | 33 | 31 | No | 0 | 0 | ... | 10 days | ... | | 1 | | | |
| Hinsdale | 86 | W. | 41 | 28 | Yes | 0 | 3 | ... | 3 mos. | 1 | 1 | | | | |
| Quigley | 87 | W. | 34 | 31 | Yes | 7 | 3 | ... | 1 year | ... | | 1 | | | |
| Little | 88 | W. | 39 | 33 | Yes | 3 | 0 | ... | 1 year | ... | | 1 | | | |
| " | 89 | W. | 53 | 51 | Yes | 7 | 0 | ... | 7 mos. | ... | | 1 | | | |
| Reed | 90 | W. | 52 | 46 | No | 0 | 0 | ... | ... | | 1 | | | | |
| " | 91 | W. | 42 | 40 | Yes | 1 | 0 | ... | ... | 1 | | | | | |
| " | 92 | W. | 50 | 48 | Yes | 0 | 0 | ... | ... | | 1 | | | | |
| Waggener | 93 | W. | 47 | 42 | Yes | 19 | 0 | M. and I. | 500 days | | 1 | | | | 1 |
| " | 94 | W. | 45 | ... | Yes | 5 | 1 | S. | 7 mos. | 1 | | 1 | | | |
| " | 95 | W. | 51 | 46 | Yes | Several | ... | M. | 100 days | | | 1 | | | |
| " | 96 | W. | 35 | ... | ... | Several | ... | I. | 8 mos. | | | 1 | | | |
| " | 97 | W. | 43 | 43 | Yes | 5 | ... | M. | 9 mos. | | | 1 | | | |
| " | 98 | W. | 34 | ... | Yes | 1 | ... | I. | ... | | | 1 | | | |
| Varick | 99 | W. | 40 | 19 | Yes | 1 | 0 | M. | 8 mos. | 1 | | 1 | | | |
| " | 100 | W. | 50 | 20 | Yes | 0 | 0 | ... | 18 mos. | | 1 | | | | |
| Norton | 101 | W. | 42 | 41 | Yes | 0 | 0 | I. | 3 mos. | 1 | 1 | | | | |
| Burge | 102 | W. | 35 | 23 | Yes | 0 | 0 | ... | 1 mo. | ... | 1 | | | | |
| Yates | 103 | W. | 40 | 39 | Yes | 8 | ... | ... | 5 mos. | ... | | 1 | | | |
| Etheridge | 104 | W. | 43 | 40 | Yes | 3 | ... | M. | 3 years | 1 | | 1 | | | |
| Potter | 105 | W. | 28 | ... | Yes | 0 | 0 | ... | 6 mos. | | | 1 | | | |
| " | 106 | W. | 46 | ... | Yes | 2 | 0 | ... | ... | 1 | 1 | | | | |
| " | 107 | W. | 39 | ... | Yes | ... | ... | ... | 2 mos. | 1 | 1 | | | | |
| " | 108 | W. | 52 | ... | Yes | ... | ... | ... | ... | 1 | | 1 | | | |
| Minges | 109 | W. | ... | 5 yrs. ago | Yes | 1 | 3 | ... | 4 weeks | ... | 1 | | | | |
| Pixley and Boerstles | 110 | W. | 45 | 25 | Yes | 0 | 0 | ... | 2 mos. | ... | 1 | | | | |
| Huselton | 111 | W. | ... | ... | Yes | 0 | 3 | I. | ... | ... | | 1 | | | |
| Willard | 112 | W. | 34 | 32 | Yes | 0 | 1 | I. | 6 mos. | ... | 1 | | | | |
| Barlow | 113 | W. | 32 | 32 | Yes | 3 | 0 | M. | 7 years | ... | | 1 | | | |
| " | 114 | W. | 45 | 30 | Yes | 2 | 0 | M. | 8 hours | | | 1 | | | |
| Kinnaman | 115 | W. | 43 | 37 | Yes | 0 | 0 | ... | ... | ... | | | 1 | | |
| Hazlett | 116 | W. | 42 | 37 | Yes | 3 | 1 | M. | 1 mo. | 1 | | 1 | | | |
| Bemays | 117 | W. | 26 | 26 | No | 0 | 0 | M. | ... | | | 1 | | | |
| " | 118 | W. | 40 | 37 | Yes | 1 | 0 | ... | ... | 1 | | | | | |
| " | 119 | W. | 40 | 38 | Yes | ... | ... | ... | ... | 1 | | 1 | | | |
| Kingsbury | 120 | W. | 32 | 31 | Yes | 1 | 0 | S. | 10 days | .. | 1 | | | | |
| Milbourne | 121 | W. | 33 | 31 | No | 0 | 0 | ... | 3 years | 1 | 1 | | | | |
| Hawk | 122 | W. | 45 | 40 | Yes | 4 | 2 | ... | 3 mos. | ... | 1 | | | | |
| Webb | 123 | W. | 31 | 29 | Yes | 0 | 0 | S. | 8 mos. | ... | | | 1 | | 1 |
| Foster | 124 | W. | 50 | 35 | Yes | 4 | 0 | ... | 2 years | 1 | 1 | | | | |
| " | 125 | W. | 57 | 30 | Yes | 1 | 0 | ... | 7 years | 1 | 1 | | | | |
| Coulin | 126 | W. | 40 | 34 | Yes | 4 | 0 | M. | 3 years | ... | | 1 | | | |
| Davis | 127 | W. | 49 | 42 | No | 0 | 0 | ... | 10 mos. | 1 | | 1 | | | |
| Vinke | 128 | W. | 36 | 33 | Yes | 2 | 1 | S. | 3 years | 1 | 1 | | | | |
| Starkey | 129 | W. | 31 | 29 | Yes | 1 | 1 | S. | 4 mos. | ... | | 1 | | | |
| Greene | 130 | W. | 45 | 41 | Yes | 4 | 0 | M. | ... | 1 | 1 | | | | |
| Cross | 131 | W. | 44 | 36 | Yes | 2 | 1 | ... | 1 mo. | ... | | 1 | | | |
| Thomas | 132 | C. | 30 | ... | Yes | 3 | ... | ... | ... | | | 1 | | | |
| " | 133 | C. | ... | ... | ... | ... | ... | ... | ... | 1 | | 1 | | | |
| " | 134 | W. | 29 | 29 | Yes | 3 | ... | ... | 6 mos. | | 1 | | | | |

*S.—Submucous. M.—Mucous. I.—Interstitial.

| Physician's Name. | Case. | Color. | Age. | Age Tumor Noticed. | Married. | Children. | Miscarriages. | Variety of Tumor.* | Length of Treatment. | Result. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Hemorrhage, etc. Relieved. | Tumor Smaller. | Tumor Absorbed or Expelled. | Tumor not Affected. | Died from Tumor Directly. | Died from Tumor Indirectly. |
| Wilcox | 135 | W. | 34 | 33 | Yes | 3 | 0 | M. | ... | 1 | | 1 | | | |
| " | 136 | W. | 33 | 30 | Yes | 1 | 2 | M. | ... | | | 1 | | | |
| Helm | 137 | W. | 32 | 29 | Yes | 2 | 0 | S. and I. | 2 years | 1 | 1 | 1 | | | |
| Baker | 138 | W. | 51 | ... | Yes | 9 | 0 | M. | 6 mos. | 1 | 1 | | | | |
| De Wolf | 139 | W. | 42 | 27 | Yes | 3 | 1 | I. | 6 mos. | 1 | | | | | |
| Nelson 1 | 140 | W. | 20 | 19 | Yes | 1 | 0 | S. | 2 years | 1 | 1 | | | | |
| " 2 | 141 | W. | 43 | 32 | No | 0 | 0 | S. | 8 years | 1 | 1 | | | | |
| " 3 | 142 | W. | 34 | 30 | Yes | 4 | 3 | M. | 4 years | 1 | | 1 | | | |
| " 4 | 143 | W. | 44 | ... | Yes | 0 | 0 | S. | 2 years | 1 | 1 | | | 1 | |
| " 5 | 144 | W. | 41 | 34 | Yes | 1 | 0 | S. | 2 years | ... | ... | 1 | | | |
| " 6 | 145 | W. | 38 | 36 | Yes | 0 | 0 | I. | 2 years | ... | 1 | | | | |
| " 7 | 146 | W. | 46 | 40 | Yes | 0 | 0 | S. | 1½ years | ... | 1 | 1 | | | |
| " 8 | 147 | W. | 26 | 26 | Yes | 0 | 0 | S. and I. | 6 mos. | 1 | | 1 | | | |
| " 9 | 148 | W. | 35 | 33 | Yes | 2 | ... | M. | 2 years | 1 | | 1 | | | |
| " 10 | 149 | W. | 20 | 18 | No | 0 | 0 | I. | 3 mos. | | 1 | | | | |
| " 11 | 150 | W. | ... | ... | ... | ... | ... | I. | 1½ years | | | 1 | | | |
| Clark | 151 | W. | 40 | 33 | Yes | 1 | 2 | I. | 4 years | | 1 | | | | |
| Brailler | 152 | W. | 39 | 36 | Yes | 6 | 1 | M. | 3 years | | | 1 | | | |
| " | 153 | W. | 25 | 24 | Yes | 4 | 1 | | 1 year | 1 | | | | | |
| | | 148 W 5 C. | | | | | | | | | | | | | |
| Total | | 153 | | | | | | | | 50 | 61 | 79 | 2 | 6 | 5 |

*S.—Submucous. M.—Mucous. I.—Interstitial.

In Cases 68 and 137 different tumors in the same patient are reported in the summary as "absorbed" and "smaller," but they do not appear in the totals but once.

## CONCLUSIONS.

1st. If further proof were needed, these cases demonstrate the great value of the preparations of ergot in the treatment of fibroid tumors of the uterus.

2d. No great progress has been made in finding the cause or causes producing these tumors, though the suggestion of Dr. Byford, that "long-continued hyperæmia of the uterus strongly predisposes patients to fibroid tumors," seems to be verified, and it will be seen in these reports that frequent parturition, miscarriage, induced or accidental, malposition of the uterus, and the peculiar conditions of sterility, voluntary or otherwise, or approaching menopause, more commonly accompany or precede the development of these tumors.

May we not suppose that there is a local perversion of that trophic nervous impulse which in pregnancy so wonderfully stimulates the development, not only of the reproductive organs, but to some extent of the whole body, and that this is facilitated by long-continued congestion of a part or the whole of the uterus, or the ovaries, or both?

The uterus possesses germinal or embryonic muscular and fibrous tissues which are stimulated to develop by pregnancy, and may be by pathological processes.

Fibroma are more likely to develop in the cervical region and myoma in the fundus, where these tissues normally predominate.

3d. The opinion that fibroid tumors of the uterus occur with greater frequency

among people of the African race or their descendants, does not seem to be warranted by these reports—but five colored in the 153 cases.

4th. The dose in the interstitial and subserous varieties should be sufficient, if possible, to lessen their blood supply and so their growth, without producing actual death of the whole or any part of the tumor. While such a result may be rare or impossible in the subserous variety, several cases have been reported in which necrosis of tumors of the interstitial variety has occurred, producing abscesses more or less serious and sometimes a septicæmia which has proved fatal. In the submucous variety we need not so much fear such a result, as it would soon be expelled and a serious poisoning avoided.

The dose should be sufficient to produce sensible but not painful contractions, surely, for any considerable time, in the subserous or interstitial varieties, and in the submucous form it is not desirable to produce very much pain except while the os is dilating and the tumor being expelled, and then, in most cases, local assistance of great value may be rendered and the doses perhaps increased.

5th. We believe ergot acts upon the unstriped muscular fibre wherever found, hence the pallor of the skin, the dizziness, and disturbances of the brain, through the changes in its vascular supply, the weakness and pains in the limbs, the vomiting and stomach and intestinal derangements. Hence, we may expect advantage from the action of ergot upon the muscular coat of the arterioles, as well as upon the muscular fibres of the uterine walls.

6th. When extensive adhesions to adjacent organs have been formed, new sources of blood supply are acquired, and ergot is not likely to be of permanent advantage.

7th. Large and long-continued doses (as in Case No. 141, in which nearly 36 pounds of selected ergot has been used during nearly eight years), are not likely to produce gangrene in the extremities or other organs, as has been taught formerly; at least, none of the physicians making these reports have observed cases.

8th. The small percentage of deaths is also very remarkable—but 11 in the 153 cases. Cases numbered 12, 13, 16, 17, 29, 53, 59, 79, 93, 123 and 143.

In Cases 12, 13 and 17 ergot seemed to control the disease, and had it been continued, favorable results were to be expected.

Cases 16 and 29 died of septicæmia after expulsion of the tumor; such cases in future, it is to be hoped, by improved methods, we may usually save.

Cases 53 and 59 died only indirectly from the tumor, perhaps from embolism, the ergot having expelled or absorbed the tumor before death.

In Cases 79 and 123, pregnancy was an important factor in the unfavorable result.

In 93, recovery seemed assured from the ergot, had the patient lived near her medical attendant.

In 143 life was prolonged by ergot, and made quite comfortable during two years, when no operation would be allowed by the patient, and her condition would hardly justify any.

9th. The small number of cases reported as not affected by ergot is quite remarkable—but two of the 153 cases.: Case 115, in which perhaps it might have been administered in some other form with advantage, and Case 123, in which pregnancy was an important complication. All the 153 cases were benefited by the ergot, more or less, except these two. Seventy-nine were cured—tumor absorbed or expelled. In 61 other cases the tumors are smaller and their growth controlled, and there is every promise, with ergot, and perhaps without, that they will not again endanger life, and perhaps not inconvenience the patients; making 140 of the 153 cases cured or relieved of much of their distress. Adding the cases reported by Dr. Byford,* we have the grand total of 101 cases cured and 119 benefited; or, 220 relieved and but 34 died

* See "Byford's Diseases of Women." 3d edition; page 516.

or no result, out of the 254 cases. Surely the ergot treatment is a safe and reliable mode of treatment, as illustrated by these cases.

FORM PROPOSED FOR PHYSICIANS' RECORD OF CASES OF UTERINE FIBROID TREATED BY ERGOT.

Date,.....

Name, Initials.....Color.....

Residence.....

Occupation.....Birthplace.....

Present Age.....Age Puberty.....

Age Married.....Age Tumor first noticed?.....

Children—Number.....Ages.....

Miscarriages—Number.....About Dates.....

.....

.....

Menstruation: { Regularity..... Amount..... Pain.....

Leucorrhœa: { Character..... Amount..... Constancy.....

When did Menstruation begin to be profuse?.....

When did Leucorrhœa begin to be profuse?.....

Size of Tumor when first examined, estimated diameters?.....

Depth of Uterine canal, measured by sound?.....

Location of Tumor, anterior, posterior, lateral wall, fundus or cervix?.....

Variety—Subserous, interstitial, submucous?.....

Adhesions to what other organs suspected?.....

Subsequent Measurements and Dates.....

Supposed Causes: { Predisposing. Exciting.

Kind of Ergot used, Corn or Rye?.....

Preparation, Fld. Extract, Etc.?.....

When began use of?.....

How Administered—Mouth, Rectum, Hypodermically?.....

.....

Dose and frequency, beginning?.....

When increased?.....

Largest doses continued how long?.....

Present doses?.....

Total quantity used from beginning to present time?.....

.....

Bad effects, if any?.....

When appear, from what doses?.....

Good effects, when appear?.....

What doses used?.....

Any other facts of importance?.....

If the case was fatal, was there a post-mortem?.....

Has the case been previously reported, when and where?.....

Result,..... Result microscopic examination?.....

Physician's address in full, written plainly,.....

.....

.....

REMARKS.

DISCUSSION.

Dr. HENRY DIDAMA, of Syracuse, New York, was called to open the discussion of Dr. Nelson's paper on the Treatment of Uterine Fibroids by Ergot.

He said Sidney Smith declared that his habit was to review a paper before reading it, for reading was apt to prejudice him so. So he ought to discuss Dr. Nelson's paper very forcibly, because he had not the pleasure of hearing it read. He knew, from the statements of members around him, that the paper was excellent. Every physician knows how beneficial ergot is in submucous and intra-mural fibroids, but he was able to report cures of two cases of extra-mural fibroids by general tonics and ergotine. That is to say, the *patients* both report the cures, and thank him for them, while he himself knows that while the tumors give no trouble whatever, they are, in reality, just as large as ever. The cures are something like the "mind-cures," which originate, like so many good things, in Boston: the real physical difficulty remaining unaffected.

Dr. C. R. REED, Middleport, Ohio.—Uterine fibroids are very common, and when small, and causing no serious trouble from pain, loss of blood, etc., should not be made known to the patient. Have treated fibroids very satisfactorily with ergot, and most fibroid tumors can be managed by the judicious use of this drug. The treatment need not be painful or exhaustive to the patient. I believe it has many advantages over electricity, and its merits are not sufficiently known.

Dr. NELSON.—I am pleased that my paper on the treatment of Uterine Myoma by Ergot should have been discussed in connection with the valuable papers on the treatment by Electricity and the Complications of Pregnancy with Myoma, bringing out so fully in a single day the Medical treatment of uterine fibroids as distinguished from the Surgical treatment, which will come so brilliantly on another day. Electricity is undoubtedly a valuable agent in the treatment of some cases of myoma, and in selected cases probably the *best*, both for the patient and the physician, and this discussion will be of great assistance in determining this class of cases; but the expensive apparatus and the frequent visits required of the patient, and the skill of the physician necessary to properly apply the electrical treatment, will be a practical difficulty in its general adoption, except in the larger cities and hospitals.

Dr. Weeks' valuable paper, and several of the cases reported in my paper, will readily testify that pregnancy may safely go on to full term complicated with fibroids, and, whether delivered at full term or prematurely, the tumors are likely to be more or less absorbed by the normal involution of the uterus after delivery, and are frequently cured, especially if ergot is given to hasten involution.

And the same rule as to delivery applies as in other cases of deformity or obstruction. If the case can safely go on and be delivered at full term, it is the best for both mother and child; but if not, the delivery should be premature.

These papers also elucidate the question whether patients with fibroid tumors should be advised to marry or not. The object of my paper was to illustrate the value of medical treatment in uterina myomata, by reports of cases, and so end in determining the question what class of cases are amenable to medical treatment alone, and what can only be satisfactorily treated by surgical operations.

And while most of the cases were treated by rye ergot, a few are reported in which corn ergot was given; one in which the muriate of lime was used with success; two in which preparations of iodine, were of value, and one of *spontaneous expulsion* without medicine.

Dr. Marie J. Mergler, of Chicago,* reports four cases of interstitial fibroids treated by fluid extract hydrastis canadensis, in twenty-drop doses three or four times a day. The results were: One, menstruation normal and the fibroid disappeared after using hydrastis six weeks. Tumor was at first one and a half inches in diameter. In three other cases of larger interstitial fibroids with almost constant hemorrhage, while hemorrhage increased during the time ergot was given, the use of hydrastis was followed by decided improvement. The patients were free from hemorrhage for two and three weeks, but no effect on the size of the tumor was noted.

The small percentage of deaths of patients by these methods of treatment must be noticed with surprise by all, and the large percentage of patients cured or benefited permanently, as compared with the small number not affected.

We must conclude, then, that the vitality of uterine myomata is readily affected by medicinal agents, and that by far the larger proportion of these tumors may be cured, or their dangerous and disagreeable symptoms so far relieved that they give the patient no great annoyance, by *medical treatment alone.*

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## ON SOME NEW APPLICATIONS OF THE INDUCED OR FARADIC CURRENTS IN GYNÆCOLOGY

### SUR QUELQUES APPLICATIONS NOUVELLES DU COURANT INDUIT, OU FARADIQUE, À LA GYNÉCOLOGIE.

### ÜBER EINIGE NEUE ANWENDUNGEN DER INDUCIRTEN ODER FARADISCHEN STRÖME IN DER GYNÄKOLOGIE.

PAR LE DR. G. APOSTOLI,

de Paris.

Les contributions que le courant induit ou faradique peut fournir à la gynécologie sont d'origine toute *française*, et je ne crains pas d'être démenti en venant rappeler aujourd'hui, devant vous, que c'est mon ami, le Dr. A. Tripier, qui en a été vraiment l'inspirateur et le père. La découverte n'est pas d'hier, elle date déjà de plus de vingt-cinq ans,† elle a mis tout ce temps à sommeiller et à mûrir. J'espère que, grâce à l'activité nouvelle qui envahit cette nouvelle branche de la thérapeutique, elle portera bientôt tous ses fruits.

A. Tripier a démontré le premier que, eu égard aux propriétés contractiles du courant induit, on pouvait les utiliser, non seulement en obstétrique, (ce dont je ne veux pas m'occuper actuellement,) mais surtout, et couramment en gynécologie. Pour lui toutes, ou presque toutes, les inflammations utérines dérivent d'une inertie initiale de la fibre musculaire, soit interstitielle, soit intra-vasculaire. De cette inertie, qui est le plus souvent post-puerpérale, naît un trouble circulatoire, une congestion et une stase sanguine, et par voie de filiation, un trouble de nutrition de tout l'organe. Rétablissez l'équilibre circulatoire, activez artificiellement et temporairement cette circula-

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* See *Transactions* of Illinois State Medical Society, 1877.

† Leçons cliniques sur les maladies des femmes, par le Dr. A. Tripier. Paris, O. Doris édition.

tion pervertie, et vous aurez rendu un double service, curatif, et préven.if à la fois. Tel est le rôle de la faradisation, tel que l'a défini A. Tripier, et dont les merveilleuses applications sont destinées à rendre de signalés services. A. Tripier, dans ses écrits, sa clinique et son enseignement, a fait de l'engorgement utérin mécanique, le pivot central de la gynécologie, pour lequel il conseille un stimulant précis, le courant induit ou faradique.

Dans un mémoire récent,* j'ài cherché à réagir contre l'exclusivisme de Tripier, en montrant l'influence prépondérante que le côté *sceptique* joue en gynécologie, influence qu'il avait méconnue. J'ai montré l'influence maîtresse, et hiérarchiquement, le plus souvent primordiale, des lésions de la muqueuse, qui n'intéressent le parenchyme que par voie de continuité, et j'ai montré que, si le courant faradique était souverain, dans les formes jeunes et purement mécaniques de l'engorgement, comme dans l'arrêt d'involution simple, il était, d'autre part, frappé de déchéance dans les formes chroniques et dans les lésions absolument muqueuses, dans *l'endométrite*, en un mot; cela se comprend, au surplus, puisque d'un côté, dans les formes invétérées, la fibre musculaire, étranglée par le tissu conjonctif de nouvelles formations, disparait le plus souvent, en partie et que par conséquent le courant induit qui est l'excitant direct de la fibre musculaire, ne trouve pas un *substratum* suffisant à son action.

D'un autre côté, dans les formes muqueuses, qui sont si fréquentes, il est évident que le courant induit aura encore moins de quoi exercer son activité. J'ai du même coup montré les ressources que l'on devait puiser dans les applications méthodiques du *courant continu*, et la place prépondérante qui lui était désormais réservée ici.

En restant dans le champ d'action du courant faradique, j'ai porté tous mes efforts pour étendre le cercle de ses applications au delà des limites que lui avait tracées Tripier, et voici les contributions pour lesquelles je revendiquerai la priorité. Les deux premières datent de quelques années, et la dernière est toute récente:

I° *J'ai modifié l'instrumentation* † à laquelle Tripier à attaché son nom—il avait créé la méthode d'excitation *unipolaire* de l'utérus, appelée utéro-sus-pubienne, et dans laquelle le circuit était constamment fermé sur le ventre.—Je lui ai substitué la *méthode bi-polaire*, grâce à une sonde qui contient les deux pôles côté à côté, et qui permet au circuit électrique de se fermer presque sur place dans l'utérus, tout en rayonnant suffisamment pour intéresser le muscle utérin tout entier. Cette méthode, en concentrant dans l'utérus, par une seule sonde tenue par le médecin, toute l'action électrique, réalise du même coup les avantages suivants:

(*a*) Elle est *moins douloureux* par la soustraction de toute application du courant sur la peau, comme cela existe dans le procédé Tripier, où l'on ferme le courant au dessus du pubis.

(*b*) Elle est *plus facile*, parcequ'elle supprime, du même coup, le concours d'un aide, ou même celui de la malade qui tenait précédemment les tampons, ou électrodes cutanés.

(*c*) Elle permet, une application *plus intense*, et d'élever ainsi le dosage électrique, puisqu'elle est moins douloureuse.

(*d*) Elle assure une plus *grande efficacité*, puisque l'action thérapeutique est, toutes choses égales d'ailleurs, proportionnelle à l'intensité électrique dépensée.

Cette méthode permet donc, tout en étant plus simple et plus facile, et tout en

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*Sur un nouveau traitement de la *métrite chronique* et cas particulier de *l'endométrite* par la galvano-caustique chimique intra-utérine. Paris, O. Doris édition, 1887.

†Sur la faradisation double ou bi-polaire, communication faite à la Société de Médecine de Paris le 28 Avril, 1883, et le 23 Février, 1884. Voir *l'Union Médicale* du 28 Octobre et du 1er Novembre, 1884, ainsi que *l'American Journal of Obstetrics*, Septembre, 1884.

faisant moins mal, d'employer un courant *plus fort, plus intense* et *plus curatif* par conséquent.

La pratique de la faradisation utérine que je conseille est donc uniforme—elle doit être bi-polaire, et la grossesse constitue une des rares exceptions à son application; mais dans ce cas, comme dans quelques autres, dont j'indiquerai l'emploi, la faradisation *bi-polaire vaginale* sera un succédané de la faradisation utérine et, quoique moins efficace, elle nous sera encore très utile.

II° A côté de la question d'instrumentation, la seconde contribution que je revendique, c'est l'application faradique, méthodique et appropriée, du *courant de tension à la gynécologie.**

Ce mot, *courant de tension*, réclame un préambule physique, que je ne puis vous donner actuellement qu'en abrégé.

Tous les appareils modernes, faradiques, ne sont complets qu'à la condition d'avoir deux bobines indépendantes l'une de l'autre, qui, suivant la grosseur et la longueur de leur fil respectif, modifient complètement les qualités ou les modalités du courant induit.

La bobine à fil gros et court engendre un courant qui porte le nom de courant de *quantité*, parceque le fil générateur est moins résistant, et laisse passer le courant en plus grande masse. Ce courant est l'excitant direct par excellence, de la contractilité musculaire, et c'est le seul que Tripier a toujours employé pour combattre l'inertie musculaire, pour produire une hypérémie vasculaire transitoire et faire ainsi la thérapeutique de l'engorgement utérin.

L'autre bobine, à fil fin et beaucoup plus long, porte le nom de bobine de *tension*, et engendre un courant, dont la force d'expansion, pour employer un langage matériel, est beaucoup plus considérable. Ce dernier courant excite moins vivement la contractilité musculaire, et devient par contre l'excitant direct de la sensibilité.

Il a donc été, et avec succès, appliqué partout où l'élément *douleur* était prépondérant, pour éteindre, par une réaction en sens contraire, une vibration nerveuse trop intense. Les applications révulsives sur la peau sont d'un usage courant que je n'ai pas besoin de vous rappeler; seule, la gynécologie n'était pas encore tributaire de cette application, qui offre pourtant le plus grand intérêt.

L'élément douleur joue en gynécologie un rôle considérable, car, si la plupart des femmes viennent nous consulter, c'est parce qu'elles ont la main forcée par la douleur.

Or si l'on jette un coup d'œil synthétique sur l'élément douleur en gynécologie, on lui trouve deux sources distinctes : ou *inflammatoire*, ou *purement nerveuse*.

D'un côté, ce sont les inflammations utérines proprement dites, et surtout la grande classe des *phlegmasies péri-utérines*, qui forme un chapitre si important, devant lequel se buttent le plus souvent, les efforts de tous les gynécologues.

De l'autre côté, c'est la douleur sine materia, absolument nerveuse, et qui, en raison de sa localisation ordinaire, porte le nom de douleur *ovarienne*.

Et bien, je ne crains pas d'affirmer que les ressources de toute la thérapeutique classique viennent le plus souvent échouer contre de pareilles douleurs, avec une impuissance presque absolue. Qui peut dire, jusqu'ici, qu'il a guéri une douleur ovarienne, à coup sûr, et d'une façon durable, par les seules ressources de la médecine, et que n'a-t-on pas fait, d'un autre côté, pour conjurer tout ce que les phlegmasies péri-utérines avaient de pénible et de souffrant.

Le problème est vaste et embrasse une partie de la gynécologie ; il est grave, de

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*Sur un nouveau traitement électrique de la *douleurs ovarienne chez les hystériques*. Communication faite au Congrès de Rouen a l'Association Française pour l'Avancement des Sciences, Août, 1883. Voir le *Bulletin General de Thérapeutique*, 15 Juin, 1885, et *Archives de Tocologie*, Juin, 1885.

plus, et ne saurait trop appeler votre attention, car on ne compte plus aujourd'hui les femmes qu'on a castrées pour de simples douleurs ovariennes, curables par un simple courant électrique.

Oui, je ne crains pas de l'affirmer, la douleur dite ovarienne, qu'on rencontre chez les hystériques, et dont le nombre est si considèrable, est, dix neuf fois sur vingt, toujours curable ; oui, la douleur inflammatoire, peut souvent, (mais je ne dis plus ici toujours), être *seulement soulagée* par la même moyen. Or c'est ce moyen, pour lequel je revendique la paternité, que je viens surtout vous exposer. J'en ai déjà fait l'objet d'un premier mémoire spécial, en 1883 et en 1884, au congrès de Copenhague, j'ai lu un second mémoire sur le traitement électrique des périmétrites.*

Le courant faradique de tension, appliqué dans des conditions opératoires données, est le meilleur sédatif que l'on puisse employer en gynécologie, si l'on se conforme aux règles suivantes, que je résume très sommairement ainsi :—

(*a*) Des deux applications possibles, soit bi-polaire intra-utérine, soit bi-polaire vaginale, l'intra-utérine sera toujours la plus active et la plus efficace, et sera toujours l'opération de choix, tandis que l'autre sera l'opération de nécessité, quand on ne voudra ou ne pourra faire le cathètérisme utérin, comme dans les cas de grossesse—chez une vierge—ou dans les phlegmasies péri-utérines trop intenses.

(*b*) La condition fondamentale du succès consiste dans la *longueur* des séances, qui ne devront prendre fin, quelle que soit leur durée, de *cinq à vingt minutes en moyenne*, que lorsque la douleur sera *calmée* ou *disparue*, suivant le cas, comme le confirmera le témoignage de la malade, et l'exploration directe. Il ne faut jamais interrompre une séance, et surtout la première, avant d'avoir obtenu un résultat plus ou moins marqué. Il faudra donc perséverer jusqu'à effet produit, et ce temps variera, non seulement chez chaque malade, mais encore chez la même malade, suivant la période de son traitement. Une première séance de faradisation exige, en général, plus de temps que la deuxième ou la troisième, qui n'aura plus qu'à parachever ce que la première avait ébauché.

Je dois toute fois souligner ce fait important, c'est que, tandis que les périmétrites ne pourront être que *soulagées* par ce moyen, la douleur ovarienne, au contraire, pourra et devra être *généralement supprimée à brève échéance, en tant que douleur spontanée seulement.*

(*c*) Les séances devront être aussi rapprochées que possible, *tous les jours*, et même *deux fois par jour*, s'il est possible, afin de rendre leur effet *sub-intrant*, pour ainsi dire, et ne pas permettre. à l'amélioration provoquée par la première séance, de s'éteindre trop tôt.

(*d*) Il est impossible de formuler une règle précise sur le *nombre* des séances qui seront obligatoires. Nous nous trouvons, en effet, d'un côté, en présence d'affections variables et multiples, *inflammatoires* ou *nerveuses ;* et de l'autre, le médicament que je propose n'est avant tout *que le médicament d'un symptome: la douleur.* Chaque cas, chaque malade, exigera donc un traitement plns ou moins long, que le tact du médecin devra proportioner au but qû'il poursuit. Dans les ovarialgies simples, de *deux à cinq séances.* seront généralement suffisantes pour assurer à la malade un calme durable pendant plusieurs mois et même plus, et en cas de récidive, le même traitement, aura toujours le même succès.

Dans les inflammations, au contraire, il est impossible de formuler un chiffre même approximatif, vu l'efficacité moins grande de la médication, d'une part, et de l'autre, vu la variété des cas et la lenteur de leur résolution.

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* Sur un nouveau traitement électrique des *Périmétrite.*—Lecture faite au congrès médical international de Copenhague, Août, 1884. Section d'obstétrique et de gynécologique (compte rendu, p. 141).

(*e*) *La technique opératoire*, qui concerne le dosage ou l'intensité à employer, (qui règle l'engaînement de la bobine), variera considérablement dans des limites extrêmes qu'il faut connaître.

1° Si on a affaire à une *périmétrite*, il faut toujours que le courant soit bien toléré, ne l'appliquer que très progressivement et très lentement, et s'en tenir, le plus souvent, dans les formes aiguës, aux doses petites, très-petites, qui grandiront avec la tolérance de la malade et avec l'amélioration de sa phlegmasie.

Il faut éviter toute douleur appréciable aux malades, d'abord parcequ'elle est *inutile*, et puis parceque une application trop intense pourrait *aggraver* leur état.

On ne saurait trop redoubler de précautions surtout au début de la séance; il faut toujours partir d'une intensité zéro (en ayant bien soin de dégaîner préalablement la bobine toute entiére) et augmenter ensuite l'engaînement, millimètre par millimètre, pour ainsi dire, en ne perdant pas de vue la physionomie du sujet qui est toujours le meilleur miroir de toutes ses sensations.

Plus la phlegmasie péri-utérine sera aiguë et plus on devra redoubler de douceur et de lenteur dans l'application.

2° Si, au contraire, c'est une *douleur ovarienne* qui est en cause, ici, tous les moyens sont bons, pourvu qu'on arrive, et le devoir du médecin est d'aboutir toujours à un résultat.

Il faut d'abord savoir, qu'il n'y a ici aucun danger, et que, du moment ou la périphérie utérine est saine, l'utérus peut impunément tout tolérer.

Or, que faudra-t-il lui appliquer pour le soulager ?

Le plus souvent c'est la dose maximum qui sera nécessaire après l'avoir atteinte progressivement. Quelquefois une dose moyenne sera suffisante pour la même but.

Quoiqu'il arrive si dans le premier cas (périmétrite) vous ne devez pas faire souffrir la malade, ici il y aura quelquefois lieu de brusquer certains utérus par une application massive du courant de tension, dans le cas où une faible dose ne serait pas suffisante.

Le dosage électrique sera donc aussi variable que ce Protée qu'on appelle l'hystérie, et réclamera une série de nuances délicates que la pratique seule pourra vous apprendre.

J'ai déjà eu à traiter des centaines de douleurs ovariennes, et je ne puis vous donner une formule identique, qui s'applique à tous les cas. Qu'il me suffise de vous dire que vous avez en mains un instrument qui présente une vraie gamme d'intensité, dont l'application se régle sur le sujet lui-même.

Si à chaque malade s'applique un traitement personnel, (et je ne parle ici que du dosage électrique), il y a toutefois des indications générales qui sont destinées a vous éclairer et à vous servir de fil conducteur.

Le plus souvent, toutes les hystériques, et c'est là un de leurs attributs essentiels, supportent très bien des courants faradiques de tension avec un engaînement maximum de la bobine ; elle le supportent même si bien, qu'au bout d'un instant d'application, elles déclarent souvent ne plus rien sentir, ce qui pourrait donner la change, et faire croire à un débutant que l'appareil ne fonctionne pas et qu'il y a une interruption dans le circuit.

Dans ce cas de tolérance absolue, il n'y a pas d'hésitation possible, c'est le maximum d'intensité qu'il faudra employer, après l'avoir atteint progressivement.

Chez d'autres hystériques, au contraire, rares il est vrai, la sensibilité est tout autre, et elles réagissent vivement, même au plus petites doses. Cette intolérance devra limiter notre action, et nous obligera à n'appliquer que des doses faibles ou moyennes, les seules que la malade pourra assez facilement supporter.

Chez quelques autres malades enfin, encore plus rares, j'ai observé le fait suivant, du plus grand intérêt : elles semblent avoir comme une anesthésie complète pour le courant de tension, qui, non seulement est toléré, mais n'est même pas senti. J'ai

alors, *par exception*, après avoir préalablement essayé de ce premier courant, fait usage du courant de quantité, d'autant plus péniblement supporté par les malades, qu'elles sont plus hystériques et alors vous assistez au phénomine curieux suivant : Chez telle malade, ou après une première application de courant de tension trop bien supportée, l'effet avait été insuffisant, si on applique un courant de quantité, même les plus petites doses sont immédiatement mal tolérées, souvent même si mal tolérées qu'elles mettent la malade en imminence de crise de nerfs. Or, c'est là le secret de la médication, le calme n'arrive que si on a provoqué artificiellement une menace de crise de nerfs, par une *brusquerie voulue* du courant faradique.

Le tact du médecin consistera alors à s'arrêter, soit brusquement, soit mieux, progressivement en diminuant, et la malade, qui avait été mise en état de crise de nerfs prochaine, la verra immédiatement avorter, et une détente subite se produira du même coup, la région ovarienne sus-pubienne perdra *tout, ou partie*, de sa sensibilité antérieure, et l'on pourra constater que chez telle femme qui se présente à vous avec une crise ovarienne intense, remontant quelquefois à plusieurs années, et chez laquelle la moindre pression de la région sus-ovarienne provoque une sensibilité insupportable, vous pourrez, dis-je, constater au bout de quelques minutes une transformation complète, et une tolérance absolue.

Je dois toutefois faire ici une restriction importante. Si cette douleur est appelée douleur ovarienne, c'est qu'elle dépend des plexus nerveux ovariens, mais elle siège très-haut au-dessus d'eux, et le point névralgique, dit hystérogène, se trouve au-dessus du pubis, à un large travers de doigt au dessus du bord supérieur et à deux travers de doigt en dehors de la ligne blanche. Ce point qui était hyperesthésié avant la séance, devient anesthésique immédiatement après, et la femme se sent absolument et totalement calmée, à une condition toutefois, c'est qu'on n'aille pas exciter à nouveau la source même du mal et que par le toucher et le palper combinés, on n'aille pas exercer de pression directe sur l'ovaire correspondant.

J'insiste donc sur ce fait que je formule ainsi : toute douleur ovarienne hystérique, est en général curable, en tant que *douleur spontanée*, et les malades ne s'en plaignent ordinairement plus. Dans cet état de calme, la pression sus-pubienne seule reste indolore.

Ai-je guéri la maladie, ou la source même du mal? non certes, et la preuve, c'est que la pression directe de l'ovarie, par le toucher vaginal réveille généralement la douleur momentanément assoupie, et que de plus, la récidive reste possible après un temps de repos généralement très-long.

III° J'arrive à une troisième et dernière contribution absolument neuve, et par laquelle je termine.

Certaines femmes, en dehors de névralgies ovariennes, se présentent à nous avec des névralgies multiples, localisées en des points variables et limitées de la vulve ou de l'entrée du vagin ; ce sont des *vaginismes incomplets* qui, par la douleur qu'ils provoquent, les obstacles qu'ils constituent souvent aux relations sexuelles, empoisonnent la vie de certaines femmes et résistent à tous les efforts des médecins. J'ai vu dans cet ordre d'idée, les faits les plus intéressants et les plus concluants, pour ne parler que des principaux, dont je publierai l'observation in-extenso. Chez une malade siégeait une névralgie unique, localisée au niveau de la racine de la petite lèvre droite, en un point grand comme l'extrémité de la pulpe de l'index. Une autre avait une névralgie identique de la fourchette, et sur un point aussi rétréci. Dans un troisième cas, la névralgie n'intéressait que le méat urinaire. Dans un quatrième cas, le point douloureux, de même dimension, était localisé à l'entrée du vagin et à gauche, sur le milieu de la cloison latérale gauche.

A côté de ces formes types, j'ai vu plusieurs autres exemples, à forme mixte, comme siège et comme étendue.

Voici la thérapeutique que j'ai employée, avec succès, et que je vous recommande. C'est toujours le courant faradique de tension qui sera l'agent curateur par excellence s'il est bien et méthodiquement administré.

A côté des règles générales que j'ai déjà formulées, concernant le *dosage*, la *durée* et la *technique opératoire*, et qui s'appliquent encore identiquement ici, voici une quatrième indication spéciale, qu'il est, le plus souvent, obligatoire de remplir :

Il est possible, comme je l'ai vu très nettement dans une circonstance type, que la faradisation utérine, seule, soit suffisante, et que, par voie réflexe on puisse soulager et guérir une telle névralgie, sans action directe sur elle, et par la seule faradisation utérine ou à distance.

Mais ceci est l'exception, et la règle est, qu'il faut autant que possible *localiser l'action électrique au point intéressé*. Dans ce point seul, surtout, il faut concentrer le maximum d'effet et c'est pour atteindre ce but que j'ai fait construire un appareil dont l'extrémité conique renferme les deux pôles côte-à-côte, séparés par une lame isolante de gutta-percha (voir la figure si-dessous).

Ce que tout à l'heure je vous ai conseillé de faire pour l'utérus, à l'aide de ma sonde bi-polaire, se réalise dans les mêmes conditions ici, à l'aide de mon excitateur bi-polaire.

Si toutefois la névralgie vaginale est profonde, ou si elle intéresse un segment plus

ou moins grand de l'anneau vulvaire, cet instrument sera insuffisant, et pour atteindre le but, il faudra, à l'aide d'une grosse sonde bi-polaire, faire une faradisation vaginale double, en ayant soin d'appliquer le pôle extérieur sur l'anneau vulvaire, s'il est intéressé.

Voilà, comme à vol d'oiseau, exposées très en abrégé, les applications totales du courant faradique à la gynécologie.

Souverain, dans les névralgies hystériques, utile seulement et sédatif à un degré variable dans les douleurs inflammatoires.

Vous venez de voir quelle place importante, en raison de leur fréquence, occupent les hystériques, dans cette médication ; aussi, je vais au devant d'une objection spécieuse qui pourrait m'être faite et qui est tirée de l'influence de la *suggestion*.

Vous guérissez, pourrait-on me dire, mais c'est la suggestion seule qui procure ce résultat. Je m'inscris en faux contre cette hypothèse, et au milieu de beaucoup d'autres preuves, en voici la principale : faradisez une femme, sans lui dire un mot, et du traitement que vous allez employer, et du résultat que vous en attendez, l'effet sera identique à celui qu'on obtient chez la femme prévenue.

Du reste, le courant faradique ne soulage que dans des conditions opératoires fixes et précises, de durée et d'intensité, tout cela écarte une influence suggestive qui, quoique souveraine, dans d'autres circonstances, n'est nullement ici en cause.

Dr. A. LAPTHORN SMITH, Montreal, Canada, read a paper on—

## THE NEW THEORY AND TREATMENT OF DISEASES AND DISPLACEMENTS OF THE UTERUS BY ELECTRICITY.

### LA NOUVELLE THÉORIE ET TRAITEMENT DES MALADIES ET DÉPLACEMENTS DE L'UTERUS PAR L'ELECTRICITÉ.

### DIE NEUE THEORIE UND BEHANDLUNG DER KRANKHEITEN UND LAGEVERÄNDERUNGEN DES UTERUS DURCH ELEKTRICITÄT.

There is hardly any organ in the body which has been the subject of so much mystery as the Uterus, and it is only since the establishment of the recognized specialty of Gynæcology that any systematic attempt has been made to understand its anatomy and physiology thoroughly. But even gynæcologists do not yet fully realize the importance of basing their theories as to the nature of its diseases and their treatment upon the anatomy and physiology of its structures. We have only to look up the treatment of any given uterine disease or displacement, in half a dozen different standard text-books on gynæcology, to find the opinions given to be of the most varied and even contradictory nature, which shows that they are not founded on principles. The object of my paper is to endeavor to establish the principle that nearly all the ordinary diseases and displacements of the womb are due to muscular relaxation, and if I can show that, then we have in the various forms of electricity which I shall describe an unfailing remedy for their cure.

You must therefore pardon me if I remind you of some facts in anatomy and physiology which we all know, but which we are all apt to forget.

The most important, is—

1st. That the Uterus itself is a muscular organ; it is composed for the most part of layers of non-striated muscular fibres intermixed with dense areolar and elastic tissues and large blood vessels. It is the state of permanent contraction or tone of these fibres which keeps the organ upright on itself, and which in health prevents it from flexing by its own weight either backward, forward or to one side. The loss of this tone may be due, as in the case of any other organ, to defective nutrition, or defective innervation. Thus, if the whole blood supply be of a poor quality the muscular fibres will be poorly nourished and their tone will decrease, and the organ, even if normal in every other respect, will drop over by its own weight, causing a flexion. This will be still more the case, of course, if from any reason its size and weight are increased. These fibres receive their nerve supply from the sympathetic, and if from any reason this great nerve is unable to send out the proper amount of nervous fluid, they will relax for want of orders to contract; it must be remembered that even involuntary muscles must have a constant supply of nervous fluid for their working.

The second important fact is, that the arteries of the uterus are large and tortuous, and that they occupy canals in the uterine substance; so that they have a double means of having their calibre limited; first, by means of the muscular circular fibres, which, in health, are always in a state of contraction or tone, which varies with the amount of nervous excitement; and secondly, the size of the vessels is limited by the contraction of the muscular fibres of the uterus itself, which surround the vessels in every direction. It naturally follows that when these latter are relaxed, the quantity of blood in the uterus will be greatly increased, and the organ will become heavier. And increased weight, with diminished power to support it, leads to the bending of the tube, or flexion. The quantity of blood in the organ, and its consequent increased weight, does not always depend, however, upon the faulty tone of either the muscles

of the uterus itself, nor of those of its arteries; they may be doing their duty, and yet the uterus may be overloaded with blood, because there is an obstruction to its outflow. You know that all the blood pumped into the uterus by the uterine and ovarian arteries, has to get out again through the uterine veins, which empty into the internal iliac, or else by climbing up the long ovarian or spermatic veins, which empty, the right into the vena cava inferior, and the left into the left renal vein. I need hardly remind you that the left ovarian vein opens into the renal vein at right angles, and that, according to a well-known principle in physics, the current is therefore at a considerable disadvantage. This has a very important bearing on ovarian pain. We know that pain in the left testicle is much more frequent than in the right, for this same reason; the testicle and ovary resemble each other in many respects; and as pain in the left side is an almost constant symptom in female diseases, I think it very important that we should recognize this reason. But this is not the only cause of pain being more frequent on the left side. There is another obstructive cause of dilatation of the uterine veins, and that is constipation. This is a cause which hardly seems worthy of being noticed by the great authors, so I shall not apologize for saying that constipation is a frequent cause of female diseases, for I have found it present in ninety out of every hundred women who have consulted me. Well, what has constipation got to do with the uterus? We have just seen that the uterine veins empty into the internal iliac, and that these latter empty into the common iliac. Now, the left common iliac vein comes up out of the pelvis to join the inferior vena cava, and in doing so passes over the brim of the pelvis, just where the sigmoid flexure ends and the rectum begins, and as a great many women have from one to two pounds of hard fecal matter stored up just there, it is no wonder that the delicate compressible vein is pinched between the bowel and the bone, and the current being almost stopped, the blood backs up in all the branches, and so you get congestion of the uterus just in the same way as you get piles, for the inferior hemorrhoidal is a branch of the internal pudic, which empties into the internal iliac.

Well then, this causes more blood to stagnate in the uterus, and this brings me back to muscular relaxation again, for fibres that are fed on stagnant blood cannot be well nourished, and so the organ bends. This bending itself reacts again, by obstructing the circulation still more, just as the current of water in a rubber hose is arrested by a kink in the tube.

The next muscles I have to deal with are ones which are little known, indeed, till lately, almost ignored; I refer to the muscles of the uterine ligaments. I have even seen a great surgeon, who was also, of course, a good anatomist, smile incredulously when I made the statement that there were real, live muscles in the uterine ligaments. After hard fighting he admitted that there might be a few muscular fibres in them, but only in a rudimentary state.

Barnes speaks of them as muscles, or partly muscles, and he quotes Mr. Rainey, and Sappey and Cruveilhier, who have given them a great deal of attention.

As the new treatment of displacement is based very largely on the fact that the uterus is held in its proper place by muscles, and not by ligaments, I must take some pains to prove that such is the case. And I may begin by saying, that I think it has been an unfortunate thing for the treatment of displacements, that the name of ligament was ever applied to those muscles which support the uterus. The word ligament generally gives one the idea of a strong, firm, in elastic structure, which is not at all the nature of the uterine supports; one of the unhappy consequences of this erroneous idea has been that when, from causes which I shall fully explain, these supports fail to do their duty, they have been replaced by mechanical ones of a kind resembling ligaments rather than muscles; that is to say, that the pessaries have too often been made of wood, metal or hard rubber, instead of some soft and elastic material. If you seize the healthy uterus with a

vulsellum and draw it down, it requires considerable force to hold it there, and when you let it go it will slip up again, or rather be drawn up, unless you have held it down long enough to tire out the muscles, when it will remain down until they regain their strength. This would not be the case if the uterus was supported by ligaments only.

Then, again, we are often consulted by women who tell us that their wombs had come down suddenly, as the result of a fright; while many others, regular old stagers, come to us about July or August every year, during the very hot weather, when everybody and everything seems relaxed, to have their wombs replaced. I had long held the opinion that displacements of the womb were due, either to the organ being too heavy for its supports, or the supports being too weak for the organ; or to a combination of these two factors, as is most often the case. So, while I was studying in Berlin, a few years ago, with Veit, who is one of the most practical of European gynæcologists, I asked him, "What keeps the healthy uterus in place?" His answer was prompt and brief: "Muscular tone." Being pressed for further explanation, he replied, "muscular tone in the organ itself, which prevents it from being flexed; tone in the muscles of the ligaments, which prevent it from being everted; and tone in the muscles of the vagina and perineum, which prevent it from being prolapsed." So that, evidently, he realizes the importance of the want of muscular contraction as a cause of displacement.

I have already gone into the anatomy of the uterus itself; I must now take up the anatomy of the ligaments. They are the round ligaments, the broad, the utero-vesical, and the utero-sacral. Of these the only real ligament is the utero-vesical, which connects the neck of the uterus to the bladder, and which is devoid of muscular fibres; but it does not support the uterus, for when the womb is prolapsed it drags the bladder with it. The round ligament, so-called, is not really a ligament, but a bundle of muscular fibres derived from the transversalis and uterine vessels. It is capable of undergoing fatty degeneration, like all other muscles, and this we know it does, for several of the ablest operators, who have tried to find it in order to perform Alexander's operation, tell us that in a certain number of cases they found the so-called ligament so soft and pliable that they did not dare to draw on it; or when they did, it broke in their hands.

Malgaigne says that the utero-sacral ligaments are composed of non-striated muscular fibres, and Sappey and Cruveilhier find the broad ligaments to contain a large number of muscular fibres. Barnes says he has often seen the uterus brought down to the vulva in the vagina by expulsive efforts at defecation. This could not be the case if the organ was held in place by unyielding ligaments, but could be easily understood if we remembered that it was depending on weak and relaxed muscles for its support.

The question may be asked, "Do the folds of the peritoneum count for something among the uterine supports?" The answer is "No." For we see, in another case, when the intestines protrude through a hernia, they continue to fall until they are stopped by the scrotum, notwithstanding that they are surrounded by numerous folds of peritoneum.

As to the vagina, I presume that I need not bring any evidence to show that it is a muscular structure, for although it has very slight contractile power in the weak and delicate woman, all nerves but no muscles, whom modern education turns out of her workshop, yet in the pure, well-developed woman from the country, the vagina is a strong muscular column or tube, which of itself could easily support the weight of a normal uterus. Where the perineum is torn, the vagina, of course, loses its foundation and can no longer act as a supporting column. Almost while writing this, I witnessed a beautiful demonstration of the muscles of the perineum; a lady, whom I had this spring made up my mind to operate upon for lacerated perineum and prolapsus, on my return from Europe came to me begging that I would try to cure her without an

operation. I yielded to her solicitation, and decided to let her have a trial of Apostoli's method. I gave her four vaginal applications of the faradic current from the short, thick wire, with results which were more gratifying each time. After the first application her womb remained up only for a few hours; the second time for nearly the whole day; the third time for a day and a half, and the fourth it had not come down at all, and she said she had not felt so well and strong for years. She was forty-seven years old, and had had twenty pregnancies, although only sixteen of the children were born living, and her uterus was prolapsed several inches outside of her body, while the rectocele and cystocele were enormous. If ever there was a case suitable for operation, that was one, so that I did not feel very sanguine when I began the electrical treatment of so formidable a condition. At the fifth application, I perceived that the uterus was being held and lifted up by the vagina, and that the muscular tissue in the labia was in a state of contraction, similar to what we notice in the arm when the poles of the faradic current are held in the hand, and the patient said she felt as if her womb was being drawn up into a knot. It was a clear demonstration of the muscular element in the uterine supports.

What has been the treatment of displacement in the past? Too often, I think, we were in the habit of contenting ourselves with a method of treatment which showed that we did not realize the true situation. Thus we read that one of the leading specialists had in his office 500 pessaries which he had tried in as many different women, and no two of which instruments were exactly alike. To treat displacements with pessaries is never curative; at the most it is merely a palliative measure. The same want of appreciation of the real trouble has led to the same error of treatment in other branches of surgery. Take lateral curvature of the spine, for instance, a common disease among growing girls at school. This disease, unlike angular curvature, is entirely due to faulty muscular development; owing to the position of the girl at her desk, the muscles of one side of the spine are not called upon to contract, the work of supporting the spine being transferred to the left arm, upon which the weight of her body rests. Then, according to an unfailing law of nature, by which all muscles atrophy when no longer exercised, the muscles of one side of the spine become weaker and weaker, until they become incapable of counterbalancing the action of the muscles of the opposite side, which have not degenerated, and lateral curvature is produced. This atrophy or degeneration of unused muscle is very marked in the case of a blacksmith, whose right hand is proverbially thick and strong, but who, by reason of some local or general disease, is prevented from using it for several months.

Now, I am aware that the usual treatment for lateral curvature is to have the girl fitted with an iron or leather instrument—I have seen many of them used, but I never saw them cure a case—which is supposed to correct the curvature by taking the place of the defaulting muscles. The only effect it has is to atrophy the muscles more and more. I had such a case several years ago; a delicate growing girl was brought to me with a complicated iron corset in her hand, and which she positively refused to wear; she said she much preferred to be deformed or even to die, rather than undergo such torture. I told her mother to throw away the machine, take her girl away from school, which she had never missed attending for a day, sick or well, take her to the country for a few months' frolicking, and to stimulate the defaulting muscles with salt water. The result was that she regained her health and is now as straight as an arrow, and a splendid specimen of young womanhood.

This I admit is not the usual treatment; but I hold that gymnastics are better than splints for defective muscular contraction; the current of blood in the muscle being prevented from going back by the valves in the veins, is compelled to move onward, to make room for more fresh and nourishing blood; so that the more muscles are used the stronger they become, and anything which prevents them from being used will render them

weaker. A common history in cases of prolapsus and other displacements is that the woman, while lifting a heavy weight, suddenly felt something giving way, and then considerable pain, with incapacity to make any great effort for some time afterward. I take it the same thing has taken place (namely, rupture of some muscular fibres in the so-called ligaments, with hemorrhage into their substance,) as occurs when a man, in lifting a heavy weight, suddenly feels something crack in his back, owing to the breaking of some of the fibres of the erector-spinæ muscles. He gets what he calls a lame back, the same as a woman gets a lame womb. The man soon recovers the use of the muscles, because they are in a place where the circulation is either active or can be made so by stimulating frictions. But in the case of the woman the injury is situated in a position difficult of access heretofore for such remedies, and frequently she becomes an invalid.

It is true that the necessity for tonics in treating uterine diseases has long been known, for such drugs as strychnine, ergot and hydrastis canadensis are constantly in the hands of the gynæcologists, and I must say with marked benefit. In fact, by employing those drugs we have tacitly admitted the principle for which I am contending, for it is only because they have the faculty of contracting the muscular fibres of the uterus, or its ligaments and blood-vessels, that they have any virtue at all.

But the action of these drugs is often uncertain and the results are frequently unsatisfactory.

One of the most effective means of inducing contraction of involuntary muscular fibres in this region has been the employment of douches of hot water. Tannic acid also has the faculty of contracting the vessels of the tissues with which it comes in contact, but the effect of both these means is only local, and is limited to the vessels they touch, so that their good results are not far reaching. Glycerine, too, has hitherto been a useful ally, although it does not act like the above mentioned remedies by contracting the blood vessels, but only in virtue of chemical affinity for water, which it obtains by drawing it from the heavy and engorged womb. When I heard of Apostoli's treatment I felt at once that he had discovered an effective remedy for these diseases, and I lost no time in starting for Paris to study it. I saw that we might find in it a means of developing the flabby, flexed uterus; of putting the suspending ligament through a course of gymnastics, like any other muscles in the body, and thus remedy version and prolapsus; and that even the vagina could be toned up. What I saw at Apostoli's clinics more than satisfied me, and I at once duplicated all his apparatus; and since my return the dozen or so of cases on whom I have tried it have all improved in a marked degree, while some of them are already almost cured.

With this preliminary and very imperfect pleading for its justification, I shall now in the briefest manner possible endeavor to give an outline of the therapeutical indications, mode of administration, and dose, of each of the two principal forms of electricity.

There are three generally recognized forms of electricity, namely: Static, galvanic and faradic; the latter two of which alone are used by Apostoli. The galvanic current is principally used as a caustic for removing diseased mucous membrane, coagulating blood, or destroying foreign growth in the body of the uterus, or diminished hypertrophy of the uterus itself. You know that when the two poles of a galvanic current are immersed in water the latter is decomposed, the oxygen bubbling up from the positive pole and hydrogen from the negative, and that if you replace the water by a saline solution the salt will be decomposed, the acid going to the positive pole and the base to the negative. This same chemical decomposition takes place when these respective poles are placed in contact with the saline solution of tissue, and you have all the effects of an acid or alkaline caustic, according to the pole introduced. In employing the galvanic current in sufficiently large quantities to be effective on a

fibroid growth a difficulty arose, in that the friction was so great at the point of the skin where the other electrode touched it, that heat was produced and the skin was burned. Apostoli has overcome that difficulty by substituting a very large cake of moist potter's clay, which is placed on the abdomen of the patient, and which is used as an electrode. The faradic current, as you are aware, is a current of resistance, and has the faculty of exciting contractions even strong enough to cause pain where the induced current passes through a coil of short, thick wire, while on the contrary it has a wonderful capacity of allaying the severest pain when the current passes through a fine, long wire.

As some of those present may not be familiar with Apostoli's method, I will give a short description of the apparatus he employs.

1st. A battery of sixty of the largest-sized Leclanche's cells, connected in what is called series of tension, that is, the positive pole of No. 1 connected with the negative of No. 2, and the positive of No. 2 with the negative of No. 3, and so on. The wires of all these couples are received by a very important but somewhat complicated machine, called a collector, by means of which you can gradually bring the strength of the whole battery to bear, one cell at a time.

The collector has a double circle, by means of which the first or any used-up or worn-out cell can be thrown out of the circuit, as they would only hinder the others from doing their work. The next instrument, and perhaps the most important of all, is the Galvanometer, which must be a good one, and by means of which the dose is measured out in thousandths of amperes.

Strychnine and atropia are very useful remedies, but they would be likely to do more harm than good if we had no scales to measure them with. The galvanometer is to electricity just what a nice pair of scales are to strychnine. It is only since electricians have had accurate galvanometers that electricity could be safely and satisfactorily employed.

I may mention that the ampere is the measure of quantity, and the volt the measure of intensity, and the ohm the measure of resistance.

To still further explain these words quantity, intensity and resistance, we may compare electricity to water. Now, if you have a large quantity of water running over from a great plate tank, you would have quantity without intensity. If you have a very small quantity of water running from a very small but very high pipe, you have intensity or pressure without quantity. And if you have a current of water running through a very narrow, but horizontal pipe, you have friction or resistance.

As the acid developed about the positive pole would very soon attack and destroy the metal of the intrauterine electrode, if made of steel, a platinum or gold electrode is necessary.

As I have already said, the abdominal or extraneous electrode is made of potter's clay, which is kept very moist or is held together by being laid on a piece of tarlatan through which it transcends, and the wire is connected to it by means of a small flat piece of zinc.

Some sharp steel trocars are also required, for negative punctures into the uterine or fibrous tissue.

In order to prevent the sensitive vagina from being affected you must have a piece of celluloid tubing with which to insulate the electrode or trocar. These complete the outfit for the galvanic or continuous current. For the faradic or interrupted current you must have a good apparatus furnished with three separate coils, one of which furnishes the direct interrupted current; another the induced interrupted with short, thick wire, and the third the same with long, fine wire. With this outfit you require Apostoli's bipolar uterine and vaginal collectors, which consist of the two poles, each ending in a nickel ring, one being about two inches shorter than the other, and being covered

with gutta percha, for the purpose of insulation. They are exactly similar, the only difference being their diameter, which has, of course, to be less for the uterine one.

A spirit lamp and a porcelain tray containing carbolic acid are also necessary, for disinfecting the trocars and sounds thoroughly.

I might say, in passing, that the great secret of the immunity from danger which characterizes Apostoli's treatment is the thorough antisepsis which he rigorously carries out. Neither does he himself, nor will he allow his assistants or visitors, to even examine a patient without scrubbing the nails and fingers with an antiseptic solution, and every instrument introduced into a woman has been first disinfected with fire, if it will bear it, or with pure carbolic acid if otherwise. As Apostoli says, in one of his works, which I have nearly finished translating for the press, the uterus will bear anything and everything, provided you do nothing suddenly and provided you carry out a perfect antisepsis. We need not wonder at the necessity for the latter when we reflect that the lymphatics of the uterus and even its centre, are in direct communication with that immense lymph sac known as the peritoneum.

I need not take up any of your time in explaining the indications for the use of the constant current. Apostoli has achieved a world-wide reputation for his method of treating fibroids. Even the most conservative of the leaders of gynæcology, such as Sir Spencer Wells and Keith, came, saw, and went home convinced of its excellence.

In a paper which Dr. Keith recently read before the British Medical Association at Dublin, he said: "As regards the material changes, we may affirm that every fibroid tumor submitted to his treatment, sometimes after so short a time as one month, but certainly when the treatment is fully carried out, will undergo a manifest reduction in size by internal measurement. The further diminution of the tumor which continues for some months, varying from one-half to one-fifth of the original volume, is generally associated with a coincident and equal accumulation of adipose tissue on the abdominal walls. The regression of the tumor is not only apparent during the time of active treatment, but goes continually on after it has been suspended, and is the persistent proof of the enduring influence of the electrical operatives.

In the five years ending this July he has made 5201 applications of continuous galvanic currents, for most of the maladies included in the gynæcological nosology, which he enumerates in the following order: Fibroids of the uterus, polypi, entire or partial hypertrophy of the uterus, subinvolutions, acute and chronic metritis, ulceration of the neck of the uterus, peri-uterine inflammations, cellulitis, ovaritis, etc."

The mode of administration consists in placing the well-wetted cake of clay on the abdomen, connecting it with the collector, and then covering it with a towel, which the woman presses with the hands. The fibroid felt in the posterior cul-de-sac or anywhere near that region, a steel trocar is introduced the distance of a quarter of an inch, the vaginal part of it being protected by the insulating tube. The negative current is then turned on and gradually increased until from 50 to 250 milliamperes are indicated on the galvanometer, according to the tolerance and size of the tumor.

While an assistant presses the uterus downward and backward, the operator, with a finger of one hand, touches the fibroid through the posterior cul-de-sac, while with the other hand he drives a long steel trocar, of which only a quarter of an inch is exposed, right into the tissue of the fibroid. The dose is gradually increased to 150 milliamperes, and it is left for five minutes, at the end of which time a long soft slough is made in the neighboring tissue of the fibroid, which comes away in a few days. The result is twofold: the fibroma is diminished in bulk to the extent of the scar, and the current contracts all the vessels of the uterus and causes absorption of the hyperplastic deposit. The operation is not dangerous, and is often performed without an anæsthetic. It is antiseptic, as that amount of electricity kills all the germs; after the operation the wound is dressed with iodoform gauze tampon. The treatment is not continued after

the woman is symptomatically cured; that is, as soon as she ceases to complain of any pain or other inconvenience from her tumor.

When the fibroid is not safely accessible from the vagina, the intra-uterine application of the positive current by means of the platinum sound suffices, but a much weaker dose is given and the applications must be numerous.

Another numerous class of cases for which Apostoli has a remarkably successful plan of treatment, are cases of chronic pelvic cellulitis or perimetritis. He punctures them with the negative electrode, and in a few days the diseased tissue either comes away in sloughs or is reabsorbed.

From what I have already said about the causes of uterine displacements and diseases depending on disordered circulation, you have probably surmised that the unfailing remedy to which I referred was electricity. Certainly no remedy could be more rational or more exact. All that remains for me to do is to make a brief reference to the mode of administration of the faradic current, which, as I have already said, has two different qualities, according to the amount of resistance in the coil.

The short, thick wire has small resistance, and offers a free passage to the current; it has the faculty of contracting muscular fibres wherever they may be, and as I have shown that all kinds of displacements, engorgements, chronic inflammations and hypertrophies are due to relaxation of muscle, the faradic current is indicated in all such cases. In prolapsus, its effects are simply marvelous; since commencing this paper I have employed it in ten cases, varying from the uterus just dropping on the perineum or sacrum, to two which came to me completely prolapsed outside of the body. The patients of their own accord say they can feel something drawing their wombs up; and after each sitting it remains up for a progressively increasing period, until it remains up altogether. I have not had a sufficient number of cases of simple retroversion to speak decidedly; and besides, with many of those whom I have under the new treatment the uterus is bound down by adhesions; I am stretching the latter by tamponing the vagina, and at the same time I am applying the faradic current three times a week, in order to strengthen the weakened ligaments. The patients, moreover, after each application, state, in the most positive manner, that they experience a feeling of well being such as they have never felt before, and which is sufficient to make them look forward with pleasure to the next application.

But still more remarkable, because almost instantaneous, are the results of the application of the faradic current in cases of ovarian pain. Over and over again I have seen patients coming to Apostoli's clinic for the first time, complaining of such tender ovaries that they could not bear to be touched, and who after ten or fifteen minutes of an intra-uterine application of the interrupted current with the long, fine wire, could bear any amount of pressure. I have lately had in my own practice two cases of severe pain in the side, which was immediately removed by an application of faradic current, which seems to act when applied in this way as a powerful nervous sedative. In a conversation which I had the other day with Doctor Bantock, of London, he told me that it had a marked anæsthetic effect, but that the result was not permanent. Perhaps, as the manipulations become better understood, the results even in these cases will be more lasting. I can only say positively that every day I use this method, in engorements or displacements, I am more and more satisfied with the results. You are all aware how common cases of subinvolution are, and how tedious they are to treat.

For this disease, and for the many varied conditions resulting from it, electricity may be considered the rational remedy, the cure par excellence. Subinvolution means deficient contraction; electricity supplies what is wanting, by setting up contractions, at first temporary but afterward permanent; the blood vessels are diminished in size and the organ becomes smaller, lighter and less vascular.

Advantages are: 1st. Simple; so simple that anybody here is quite able to undertake it. You have only to master a few little details of electricity, and you have this immensely powerful agent completely under your control.

2d. Painless; no anæsthetics required; you only give it in bearable quantities, for as the patient becomes accustomed to it and feels the immense improvement in her condition, she will gladly submit to a continually increasing quantity until the maximum is reached, which is as much as you can get with two cells and the whole coil on.

3d. Effective, because you get exactly the result you want, with mathematical certainty. The uterus is displaced because it is too full of blood and too heavy; electricity drives out the blood and lightens it. Or it is displaced because it is too weak to hold itself up; electricity puts its intrinsic muscular fibres through a course of gymnastics and strengthens it. It is displaced because its extraneous muscles are atrophied; electricity will develop them and even hypertrophy them. Or it may be displaced directly or indirectly by the loaded rectum and sigmoid flexure; then electricity, by setting up peristaltic action in the bowels and removing the cause of obstruction to its circulation, will bring about a speedy cure.

So that, in conclusion, I can say with Apostoli that, apart from malignant disease, I know of hardly any disease or displacement of the uterus which cannot be either relieved or cured by the new method of treatment.

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Dr. Franklin H. Martin, Chicago, Ill., read a paper on—

## A METHOD OF TREATMENT OF FIBROID TUMORS OF THE UTERUS BY STRONG CURRENTS OF ELECTRICITY. BASED UPON EXACT DOSAGE. BEING A MODIFICATION OF APOSTOLI'S METHOD.

### UNE MÉTHODE DE TRAITEMENT DES TUMEURS FIBROÏDES DE L'UTERUS PAR DE FORTS COURANTS D'ÉLECTRICITÉ EN DOSES EXACTES.

### EINE METHODE ZUR BEHANDLUNG DER UTERUS-FIBROIDE DURCH STARKE ELEKTRISCHE STRÖME IN GENAUEN GABEN.

That marked beneficial effects have been obtained by different methods of treatment of fibroid tumors of the uterus by means of a continuous current of electricity, is not now doubted by the majority of scientific surgeons. While the confirmatory literature on the subject at present appears to be in a very confused state, and while the reported benefits are the result of almost as many different methods of operating, one familiar with the inexorable laws that govern electricity can discern that each method that merits attention depends for its success upon the same underlying principles.

The degree of success obtained by any one operator is an indication of how capable he is of concentrating these certain well-known principles of electricity to the treatment of these pathological conditions without injury to healthy tissues, and with little inconvenience to the patient.

The one unvarying fact underlying every method must be a procedure which will cause a continuous current of electricity to traverse some portion of the pathological tissue we seek to affect. The peculiar means employed to accomplish this end by different operators is the first place where the individual tastes of the electrician will cause a change of procedure. The means employed to generate the electricity may be

widely different and yet each produce currents that are identical. But at this point we find that authors of different methods begin to utilize different principles as well as different means to accomplish the object sought.

There are two distinct effects of the continuous current that may be used, according to the inclination of the operator:—

1st. The electrolytic action.

2d. The caustic or destructive effect.

Here is a cause of wide divergence between operators. A very different generator and very different electrodes may be employed where simple electrolytic action is sought, than those which would be required if cauterization were the object in view. For example, compare the battery employed by Dr. Cutter, in the treatment of fibroid tumors, and the one recommended by Dr. Apostoli for the same purpose. Cutter's is a small battery with one cell, with elements of large surfaces, which generate a large current of low electro-motive force. He gets little electrolysis but powerful cauterization. Apostoli's battery is a large apparatus, composed of thirty to fifty Leclanche cells whose combined electro-motive force is from fifty to seventy-five volts. He gets powerful electrolytic action with comparatively little cauterization.

Also, notice the difference in electrodes used by each. Dr. Cutter employs for electrodes two strong steel needles, one from each pole of his battery, which he thrusts externally through the intervening tissues directly into the tumor to be operated upon. Dr. Apostoli employes one surface electrode, which is usually placed upon the abdomen and is for the purpose of diffusing the current so as to avoid pain to the patient, and another, internal electrode, which is either of the nature of a uterine sound or a sharpened probe that can be thrust into the presenting portion of the tumor.

Between the two extremes which may be said to be represented by Cutter and Apostoli, may be classed all other methods. These vary little from one or the other procedure that may be called respectively Cutter's or Apostoli's method, except possibly the one that can be said to stand midway between them. This is peculiar in its employment of one passive electrode on the surface of the body in close proximity to the tumor, similar to Apostoli's surface electrode, and one electrode similar to Cutter's needles, thrust either from the vagina or through the abdominal wall into the growth, and the employment of a current that accomplishes both cauterization and electrolysis.

My object in presenting this paper is to describe the details of the method that I have finally adopted for the treatment of these distressing maladies. In presenting this method much that is old and well tried will be recognized, at the same time I think enough in it that is peculiar will be discovered to make it worthy of attention.

I have been led to the adoption of this particular procedure not only as a result of a thorough analytical study of the several methods in practice that are worthy of consideration, but from practical tests of these methods on patients, and finally, as a result of the universal satisfaction obtained from a fair test of the method itself.

I offer, as an additional justification for presenting a new suggestion of treatment, the following facts:—

1. It relieves the pain, checks the hemorrhages, and rapidly reduces the size of the tumor, without pain.

2. The operation is absolutely free from danger, or even temporary inconvenience.

3. The construction of the electrodes is based upon well-known laws of electricity in such a way that specific dosage is made practicable, and more definite results are assured.

In the procedure that I am about to describe I have endeavored to utilize all the properties of electricity that experience has demonstrated, by other methods, are of value in the reduction or relief of symptoms of the malady under consideration; at the

same time I have endeavored to utilize their properties in such a manner as to do away with the objectionable and dangerous elements of the older methods.

I wish to point out some of my objections to these before describing my own method, that my motives in introducing an innovation may be rightly judged.

The first method I referred to is that adopted by Dr. Ephraim Cutter, of New York, a description of which will be found in an article, commencing in the *American Journal of Obstetrics* for February, 1887, where the results of fifty cases are reported. The method adopted I will give, to a great extent, in his own words:—

"The battery—Stöhrer's. Eight plates of carbon, nine by six inches; eight plates of zinc, nine by six inches. The carbons one-fourth of an inch thick. They (the plates) are arranged so that the zincs come on the outsides, thus; zinc, carbon; zinc, carbon, zinc, etc. The carbons are connected on one side and zincs on the other.

"Solution. Potassic bichromate dissolved in cold water to saturation. Add to one gallon of this saturated solution eight ounces of commercial sulphuric acid."

The conductors are connected with the battery by binding screws on the ends of two rods of copper, one of which is connected with all the zinc plates, the other with all the carbon plates.

The Electrodes. "It would not answer," he says, "to have an electrode that would twist, jump or shoot off wildly among the viscera. The fibroid alone must be penetrated deeply, and in the direction which the operator deems the most desirable. The following device has been found to answer every purpose. A surgeon's ordinary director is taken, its point and edges are sharpened, an ebony handle fitted to the flattened end, and two inches of the larger end is japanned for insulation. The dimensions are as follows: Length of instrument over all, eight and one-half inches, of blade four and seven-eighths inches; width of blade at widest part, three-eighths of an inch. The foramina in the metallic portion of the handle are sufficiently enlarged to readily take in the ends of the conductors. The angle made by the two wings of the blade may be represented in section by the letter V. The point of the angle is made dull. The effect of the arrangement is to draw the tissues over the sharp edges, represented by the free ends of the V, and thus cause a ready section of the tissues penetrated. It is evident also that the union of the two blades at the angle offers a great resistance to bending in any direction. . . It has been found that the introduction is facilitated by making punctures through the skin with a lancet."

*Application of the Electrodes.*—"The patient is anæsthetized and the electrodes are introduced deeply into the substance of the growth so that they do not approach each other within half an inch. . . "If the growthis unilobar and in the cavity of the abdomen, one electrode is forced through the skin on one side of the tumor and the other in on the other side of the tumor. . . "If the tumor occupies the cavity of the pelvis and has several lobes in the abdomen, one electrode may be pushed in from the rectum or the vagina, and the other electrode may be passed through the abdominal walls. If the fibroid is confined to the pelvis both electrodes are to be introduced into the growth through the rectum or vagina.

*Length of Application.*—"They vary from three to fifteen minutes in duration. The length of time is adjudged from the systemic symptoms. If the pulse became accelerated, the respiration rapid, the face pinched, the countenance hippocratic, and the skin sweaty and cold, it was thought time to stop." The writer offers the suggestion here that "etherization masks these symptoms somewhat and should be allowed for, that is, not to push the time too far."

The frequency of the operation depends upon the case. It has been done every day for a week; usually once a week or fortnightly. The patients are prepared for these applications in the same manner as for any severe surgical operation. In the after-

treatment we notice mention of hypodermic injections of morphia, stimulants, a week in bed, etc., after each application.

The results from this treatment in a series of 50 cases is as follows: 7 non-arrests; 4 deaths; 25 arrests; 3 relieved; 11 cured.

It seems to me if electricity is to be of value in the treatment of fibroid tumors of the uterus it must come with a method presenting fewer horrors than the more radical operation with the knife, or it must present better results.

From a thorough study of the above method and the results reported by its author I am constrained to say I do not recognize anything in it to recommend it over the older operations of the knife.

This operation is objectionable—

1st. Because of its severity. The pain attending it is excruciating. The influence on the general system is almost overwhelming; the operator being called upon to stop proceedings after the operation has been in progress but five to eight minutes, because of approaching collapse. The severe operation, too, is not limited to one application, but in the majority of cases is to be repeated a number of times.

2d. The method is objectionable because the results do not justify the means. In 50 consecutive cases treated, 11 cases are reported cured. In the light of our present experience a large percentage of those cases would undoubtedly have been cured by laparotomy for complete removal of the growth. And with the additional choice that we now have of removal of the appendages, if proper discrimination had been shown I cannot believe that the number of deaths would have exceeded four, the number reported in Cutter's 50 cases. To my mind, if this method of operating on fibroid tumors cannot exhibit better results than laparotomy, its popularity will not become great.

3d. Cutter employed no method by which he could even approximately gauge or measure the amount of electricity employed. True, he tells us that his battery measured 27 amperes, but that in no way gives us the strength of the current he employs when a portion of the patient becomes a part of the circuit. An operative procedure by electricity that lacks exactness is fraught with great capabilities for harm and never can become popular with scientific men.

The objections that I have to the method that stands midway between Dr. Apostoli's and Dr. Cutter's, have been partly answered in my objections to the latter's method. The operation requires that an anæsthetic should be employed. The operation is so severe in some cases that even under an anæsthetic a patient has been known, by the contortions of the face, to manifest suffering. The battery employed is one that will generate a current of high electro-motive force, and is the same as used by Dr. Apostoli. By means of this battery and a milliampere metre the strength of current can be more nearly gauged than with Cutter's apparatus, and consequently the amount of work accomplished in any given case can be more accurately estimated. With this operation, however, as with Cutter's, the effect of the electricity on the tumor can only be cauterization and varying electrolysis around the uninsulated portion of the needle electrode. There is the same danger in this operation, though to a less extent (one needle being used instead of two), of peritonitis from wounding the peritoneum; the same danger, though to a less extent, of a careless operator septically infecting the patient with the needle electrode.

Dr. Apostoli's method, occupying the opposite extreme from Dr. Cutter's, is the last of the older methods that I will glance at. It is a system based upon well known laws of electricity, and merits attention because of its completeness of detail, and for the rational and sound principles that its author has systematically utilized to successful ends. The principles sought out by Dr. Apostoli, and so well crystallized into one

compact method, will, without doubt, constitute the basis for all other methods for treating fibroid tumors of the uterus by electricity, for all time to come. For this reason I shall take considerable pains to make clear the principles involved in this rational procedure, so that in coming to the method I wish to describe, which owes much to Dr. Apostoli, it may be well understood.

The battery used by Dr. Apostoli is one that has an electro-motive force of 50 to 75 volts. It is composed of a series of Leclanche cells connected with a selective switch-board which renders it possible to utilize any number of cells from 1 to 50. The two electrodes employed in all operations are connected with either pole of the battery. A galvanometer is included in the circuit, graduated for milliamperes, that will measure a current of at least 500 milliampere strength. The electrodes are of two varieties; (1) The passive electrode. (2) The active electrode. The passive electrode is composed of a biscuit of potter's clay, which has the advantage over many other forms of electrode, when spread over a large surface, of reducing to a minimum the pain caused by the passage of a strong current of electricity.

The active electrodes employed by Dr. Apostoli are two in number. One is fashioned after an ordinary uterine sound, and is for application in the uterine canal. It is formed from unattackable metal. This sound is attached, by means of a conducting cord, with one pole of the battery. A muff of rubber tubing insulates the vaginal portion of the sound from the surrounding tissues. The other electrode is also manufactured from unattackable metal. It is similar in size and shape to the other sound, except, that instead of ending at the distal end with a bulb, it ends with a sharp point. This electrode is for the purpose of forming an artificial uterine canal where it is impossible to follow the natural one. This is accomplished by thrusting this sharpened sound from some point in the vagina into the most suitable portion of the presenting uterus or tumor.

The distinct operations employed by Dr. Apostoli, are four in number:—

1. The galvano-caustique positive.
2. The galvano-caustique negative.
3. The galvano-puncture negative, with galvano-caustique negative or positive.
4. The mixed operation of treating a case successively by galvano-caustique positive or negative.

The first operation, *galvano-caustique positive*, is employed primarily for the purpose of checking hemorrhages from the uterine canal. The internal active electrode, which is fashioned after a uterine sound, is made to conform to the uterine canal, and is properly insulated, with the rubber muff, to the cervical point, and is attached to the positive pole. After the abdominal surface electrode is applied, and the connections made secure, a current of sufficient intensity is turned on to produce active coagulation at the surfaces of contact of the internal electrode.

The local effect of the positive pole when employed as the active electrode with a strong current, is to produce coagulation and condensation of the tissues with which it comes in contact, and is compared to a caustic acid. This acid effect of the pole is therefore the influence that controls the hemorrhages coincident with these tumors.

The second operation, the *galvano-caustique negative*, is employed for the purpose of enlarging the uterine canal and for the rapid reduction of the size of the tumor. The same internal active electrode, introduced with the same precautions and with the same care for proper insulation, is attached to the negative pole of the battery. The abdominal electrode of clay is applied, the connections made secure, and a current of sufficient strength is turned on to cause active liquefaction at the internal electrode.

The local effect of the negative pole when employed as the active electrode with a strong current is to produce liquefaction of the tissues with which it comes in contact,

and is the effect of a caustic alkali. This action of the alkaline pole is an influence that rapidly reduces the size of these tumors, and is also employed by Dr. Apostoli where a hemorrhagic condition does not demand the coagulating effect of the positive pole.

The third procedure employed by Dr. Apostoli, *the galvano-puncture negative with galvano-caustique negative or positive*, is, first, for the purpose of establishing a new uterine canal where the regular canal, because of distortion, cannot be entered by the regular sound electrode; and, second, for the subsequent treatment of the tumor by means of this newly established canal. The galvano-puncture is accomplished by thrusting the pointed electrode before described, from some point of the cervical canal, if possible, and not from the vagina, into the uterus, in the direction that the uterine canal would naturally occupy. The electrode is then attached to the negative pole of the battery, and a current of sufficient strength allowed to pass to accomplish thorough liquefaction of the tissue in contact with it. When the pointed electrode is withdrawn a pervious channel is left, and this is to be employed for the introduction of the ordinary sound electrode and to take the place of a natural canal in all subsequent treatments—the galvano-caustique positive, if there is hemorrhage from it, the galvano-caustique negative, for the purpose of reducing the tumor.

The fourth procedure of Dr. Apostoli is the mixed operation of treating a case successfully by galvano-caustique negative and positive and successive séances. This is employed where it is desirable to reduce as rapidly as possible a large hemorrhagic tumor and at the same time control the hemorrhage. It is desirable, according to Dr. Apostoli, when rapid reduction in size is sought, to employ as frequently as practicable the galvano-caustique negative, but if the case is of a hemorrhagic nature it is impossible to employ this exclusively. Under these circumstances the galvano-caustique negative should only be employed early in the month immediately following the regular menstruation period, when there is the least tendency for hemorrhage to occur; the galvano-caustique positive should be reserved for the latter part of the month, in order to lessen the tendency to hemorrhage at the approaching menstruation.

The strength of the current employed by Apostoli varies from 50 to 250 milliamperes.

The success obtained by Apostoli in the employment of the mode of treatment I have hastily sketched has been gratifying in the extreme.

I am sorry I am unable to give more exact figures in regard to Dr. Apostoli's results, but in one of his latest articles* he says, in referring to 403 patients he had treated in clinic and private: "I have only to deplore the loss of two. Of these two deaths I take upon myself the entire responsibility. My method was not at fault. I alone was to blame, as may be seen by the full and detailed report.

"In one case, I admit candidly, there was a fatal error in my diagnosis. I did not recognize the presence of a suppurating ovarian cyst, which ended in death from peritonitis. In the second case death was due to a puncture made too deeply. The consequence was intraperitoneal gangrene, for which the abdomen was not opened.

"In addition, I have to confess to having either excited or aggravated, in the course of five years, ten peri-uterine phlegmonous inflammations. These must be attributed to blunders in carrying out the treatment, as will be shown when the account is published at length.

"But errors of practice happened during the early days of my work, and were either negligence of antiseptic measures, which were either altogether omitted or done imperfectly, or the too violent or too intense use of the negative pole in cases of subacute peri-uterine inflammations.

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* Read before the British Medical Association, at Dublin, August 2d, 1887.

"The fact is, the negative pole, having a strong power of producing congestion, is a dangerous weapon, which at the beginning of any treatment must be used with great prudence and reserve, if one would avoid overshooting the mark for which it is intended.

"To lay before you the facts of these accidents, will serve the double purpose of warning you of what may befall you, and preventing you from making similar errors. My caution is, that whenever the negative pole is put to use, and there is any trace of peri-uterine inflammation present, you must not only redouble your antiseptic heedfulness, but your operative proceedings must be carried on with deliberate carefulness. You must feel your way, testing the susceptibility of your patient by two or three preliminary operations, in which you can give doses so feeble that they only serve to enlighten you and habituate the patient, so as to lead on safely to the use of higher intensities.

"But when I tell you that this operative gynæcology, as I have to practice it, is carried on in such exceptional circumstances that no one else has ventured to encounter them, and upon a class of women who are obliged to walk home shortly after they get up from the couch, who seldom take the necessary rest in bed, and whom poverty forces in some fashion to get through with the ordinary duties of life, you will ask of me, with curiosity, the explanation of this illusive mystery. All that I can say is, it appears to me that the intra-uterine current, as I use it, seems to have in itself some special antiseptic and atrophic property.

"I must close these remarks on the failures, which I have no wish to conceal, but expose to you in all their nakedness, though they stand as evidence of only the usual difficulties which accompany the laborious and misty development of any new method. I do not speak of other dangers which lie in the way, such as the possibility of concealed pregnancy and accidental abortion, and also the risk of opening up vesico-vaginal fistula. I have already enlarged on this matter elsewhere, and in my next work on gynæcological electrical therapeutics I shall devote a chapter to the needful precautions.

"I am anxious to-day, as the completion of my paper, to bring forward a simple statistical statement of what has been my treatment of uterine fibroids.

"From July, 1882, to July, 1887, I have had under my care 278 patients with fibromata, or hypertrophy of the uterus, in some manifest degree, upon whom I have used 4246 applications of currents of electricity. The patients and operations may be thus classified:—

"I.—Clinic; 186 patients, 2347 operations.

Galvano-cauterizations, positive, intra-uterine, 1433.
Galvano-cauterizations, negative, intra-uterine, 593.
Galvano-punctures, negative, vaginal, 321.

"II.—Private; 92 patients, 1899 operations.

Galvano-cauterizations, positive, intra-uterine, 1085.
Galvano-cauterizations, negative, intra-uterine, 746.
Galvano-punctures, negative, vaginal, 68."

Of the remainder he says: "I do not wish to convey the impression that all these patients have been cured. It is not so, for the reason that some of them have not persevered to the end, especially in the clinic, the attendance having been discontinued upon the first feeling of amendment. But I can affirm that where there has been no negligence, ninety-five times out of a hundred permanent benefit has been acknowledged. I may also predict that, if adopted in its integrity and worked out as it should be, the mortality henceforward will be nothing."

Thus we recognize in the treatment adopted by Dr. Apostoli a rational, harmless, comparatively painless and eminently successful mode of treating fibroid tumors of the uterus by electricity. It is upon these principles that I am able, after a successful line

of practical experiments, to lay down an exact line of dosage, enabling one to obtain all the beneficial effects of electricity in any given case, without the necessity of overstepping the limits of toleration in the most susceptible or the most sensitive subject.

By analysis of the several recognized methods of treatment of fibroid tumors of the uterus by electricity, I have been led to attribute the effects of the galvanic current to four principal actions:—

1. Local effects of the poles.
2. Atrophic effect of the current.
3. Electrolytic action of the current.
4. Anti-neuralgic effect of the current.

### LOCAL EFFECTS OF THE POLES.

In considering the Apostoli method we have dwelt at length upon this point. We have seen that the effect of a metal electrode upon the mucous membrane of the uterus with a concentrated current passing through it and through the tissues in contact with it, is to produce a kind of cauterization; that this effect is similar to that produced by an alkali if the pole is negative, and to that of an acid if the pole is positive. We find an explanation for this in the following fact: If, into a solution of chloride of sodium or any other electrolyte we plunge the two electrodes of a galvanic apparatus, it will be found that there is a strong tendency for the acid radicals of the electrolyte, as it is broken up by the passing current of electricity, to gather round and attack the positive pole, and an equally strong tendency for the alkaline radicals to become liberated at the negative pole. It is just this effect that we get at the negative pole, or at the positive pole of our battery when, in the form of a metal electrode, it is brought in contact with the mucous membrane of the womb.

In order to produce electrolytic action enough in the region of a positive intra-uterine metal electrode to obtain the characteristic hardening and coagulation of the tissues in contact, by liberation of acid radicals sufficient to check hemorrhage, a certain concentration of current is imperative. In other words, a given density rather than amount of current is required.

### ATROPHIC EFFECTS OF THE CURRENT.

Atrophic effect is the name I will take the liberty of giving to a peculiar influence that is often noticed after the use of electricity on fibroid growths, which I am unable to account for in any other way than as an effect upon the trophic nerves upon which these tumors must depend for their nutrition. There are examples of rapid total disappearance of fibroids of considerable size after one or two applications of strong currents; and examples of others that have continued to gradually atrophy for months after one application, but which have not entirely disappeared. This peculiar effect cannot be attributed to electrolysis, because electrolysis ceases to effect a diminution in size as soon as the *ions* set free by the process are absorbed; which would not be likely to require more time than a very few hours. The local effect of the poles cannot account for the fact, because it has been observed where the poles had never come in contact with any part of the growth. It is well known, however, that peculiar irritations of motor or other nerve trunks or their branches which are supposed to contain inherently or in close association trophic influence, will oftentimes cause progressive or rapid atrophy of the tissues under their control. I believe that electricity, powerfully concentrated as it is in passing through these tissues, has oftentimes some such destructive effect on these trophic nerves, or nerves which carry a trophic influence, and thereby cut off the powers of nutrition in the tissues.

### ELECTROLYTIC ACTION OF THE CURRENT.

Electrolysis is the well known power of resolving compound bodies into their constituent elements by passing through them a current of electricity. Electrolysis only occurs in that part of the body which is in a fluid state. While the galvanic current passed through a soft living tissue has not an uninterrupted fluid medium, it has practically a fluid medium divided into innumerable little compartments, each one separated from the other by a thin wall of solid. During the passage of the current each of these particles of solids acts as a positive electrode on the fluid between it and the next solid particle in front, and as a negative electrode upon the fluid between it and the solid particle behind it. Each molecule of fluid in a conducting solid, therefore, in the line of galvanic current may become electrolyzed. It is found also, in passing a galvanic current through a portion of the soft tissues of the body, that there is considerable tendency to cataphoric action. That occurs by a direct transference of the fluid particles through the little permeable walls of solid in the direction of the negative pole of the body. Thus we find the effect of electrolysis on a portion of the soft fresh tissue to be: 1. A separation of combined elements (more or less) into their constituent elements, and a rearrangement of the same. 2. A general movement of the elements in solution toward the negative pole of the battery.

Now, by a little ingenuity can we not readily explain how absorption is promoted by the process of electrolysis when applied to living normal tissue? A moderate galvanic current is passed through a part, and the most susceptible molecules in the course of the current become broken into their original elements: 1. These elements immediately make a similar or different combination with neighboring elements of opposite electrical tendencies, making thereby new compounds which act as foreign particles; as foreign bodies they are promptly removed by the nearest absorbent. 2. Other elements, as they become free from their original molecules, make combinations with elements which are already leaving the tissues of their innumerable minute vascular or absorbent canals. 3. Many, in the form of gas, pour into the atmosphere beneath and surrounding the electrodes. 4. Others attack the electrodes and are disposed of in the form of deposit on their surfaces. 5. The current by its cataphoric action, that is, by its direct transference of fluid particles in the direction of the negative pole, produces an engorgement of the tissues at the negative side of the part acted upon. The absorbents in that portion of the tissue will promptly make an effort to establish an equilibrium, and by a direct action of endosmosis they are filled and the excess is carried away in their current.

This is what I believe takes place in the substance of a fibroid tumor when a more or less concentrated current of electricity is forced through it. At the active pole we are certain that electrolysis takes place, because an active bubbling of gas through the secretions surrounding the electrode is often observed. The rapid diminution in the size of the tumor in all its parts during the progress of active treatment, and its ordinary increase in many cases when treatment is suspended, forces one to attribute the beneficial effect to the absorption rendered possible by electrolysis.

### THE ANTI-NEURALGIC EFFECT OF THE CURRENT.

There is no symptom of fibroid tumor of the uterus that yields more readily to electricity than the severe pain that so often accompanies them. While in an experience of over three years with these distressing maladies I have never seen a case in which the severe neuralgies have not succumbed early, I must confess I have not been able to discover any rational explanation for the fact.

### EXACT DOSAGE.

In the treatment of fibroid tumors, tumors that I am about to describe, I have, by the adoption of peculiar electrodes and by the control of certain principles that I have

already hinted at, been able to lay down a more exact system of dosage than has heretofore been in vogue, in which all the effects of electricity above enumerated can be obtained without the necessity of causing the slightest pain to the most sensitive patient.

Experimenting, I have found that a current of 25 milliamperes traversing a positive platinum electrode of one square centimetre surface pressed firmly against the mucous membrane of an hypertrophied cervix, the circuit being completed by a large abdominal electrode, will produce a dry condensed condition of tissues beneath the surface of the plate, in five minutes.

This surface can be penetrated with a lance to the depth of one and a half millimetres, without producing the slightest tendency to hemorrhage, and the tissues are denser than normal still some distance further below the surface. Granting that the condition obtained in this experiment is what is sought, in cases of hemorrhagic fibroids, throughout the whole surface of the mucous membrane of the uterus, in order to prevent subsequent hemorrhages, we can recognize a basis in the experiment from which we can construct a table of exact dosage, so far as the treatment of the hemorrhagic element is concerned. For by carrying our experiment still further it is found that a current of 50 milliamperes is required, or just double the strength of the current required in the former experiment, to produce in the same time the same effect when the surface area is just double, or two square centimetres. If, therefore, for example, we have a uterine canal that is 10 centimetres in depth, and the electrode fitting the canal has a surface of one square centimetre to each centimetre in length, we would have ten square centimetres of active surface in contact

Fig. 1.

with the tissues ; this, therefore, figured upon the same basis, would call for a current of 250 milliamperes for five minutes, in order to get the characteristic effects necessary to check hemorrhage from the whole surface. Or, the uterine canal that would require an Apostoli electrode 20 centimetres in length, and this depth is not unfrequently met with, would require a current, if the electrode was 4 mm. in diameter, and if equal conduction took place from its entire surface, of over 600 milliamperes strength. This strength of current would not be tolerated in a large number of cases, and if it were, there is no means of being certain that the sound comes in accurate contact with the mucous membrane in its entire extent. There is no doubt, too, that a surface so large, even if it were in accurate contact, would conduct equally from its entire area; the consequences, therefore, in this case, would be excessive cauterization and subsequent suppuration of portions of the mucous membrane, and little effect, if any, on other portions. It is this uncertainty of result and painfulness of application that I have succeeded in doing away with. This is accomplished by adopting a means by which the whole mucous membrane of a hemorrhagic uterus can be successfully treated in a number of *séances* by attacking successively different portions of it until the whole area has been covered.

To accomplish this I have had constructed peculiar internal electrodes (Fig. 1). I have confined myself so far to two sizes, one with an active surface of two square centimetres, the other of four square centimetres. The first to be worked with a current of 50 milliamperes, the second with a current of 100 milliamperes. The metal that constitutes the active surface of these electrodes is platinum wire in spiral (Fig. 3, *b*), wound over soft copper wire of the required diameter. This portion of the electrode

is connected with the handle of the electrode where it receives its attachment to the battery by means of an extension of the flexible copper wire or core incased in a soft rubber insulator. This insulated portion, with its insulator, is of the same diameter as the platinum part of the sound, and is, therefore, small enough to enter the uterine canal. Upon the distal end of the platinum portion is a screw attachment upon which a small hard-rubber tip, about two millimetres in length, is attached. This tip is bulbous, and from its shape and material will follow the canal readily. One can readily see that these electrodes can be made of any required diameter to suit the exigencies of the particular case in hand, this depending, of course, upon the size and permeability of the uterine canal. I have confined myself thus far in my work to two diameters. They are of 3 and 5 millimetres, and are called respectively No. 3 and No. 5. Other sizes can be ordered of the instrument makers on the same basis of nomenclature—the diameter required stated in millimetres. Of each of these two diameters, as I have stated, I have had constructed two electrodes; one of 4 sq. cm. metal surface, the other of 2 sq. cm. metal surface. Of course, the length these active surfaces occupy on the different electrodes depends upon the diameter of the particular electrode. If it is 3 millimetres in diameter the 4 sq. cm. will occupy about 45 mm. in length of the instrument; if it is 5 mm. diameter the same surface, 4 sq. cm., will occupy but about 26 mm. in length of the instrument. In ordering, then, an electrode from the instrument

Fig. 2.

maker, the diameter of the instrument and the strength of current to be used with it should be stated. Thus, if an electrode is required of 3 millimetres in diameter and the current to be used with it is 100 milliamperes, simply order a 3–100 electrode; if a 100 milliampere current is too high, order a 3-50, which will indicate an electrode 3 mm. in diameter with a surface which will require, to check hemorrhage, a 50 milliampere current. Each set of electrodes has a rubber shield or muff (Fig. 5, *a*) that slides loosely upon the extra-uterine portion of the instrument when inserted, which acts the double purpose of an insulator for the vaginal portion and as an indicator of the depth the electrode occupies the uterine canal, the proximal or external portion of the staff of the instruments being graduated into centimetres for this purpose.

The manufacturers of the instruments illustrated in this article, "The McIntosh Galvanic Faradic Company," of Chicago, to whom I am under great obligations for their untiring skill in carrying out my ideas, have arranged in a compact case the inter-uterine flexible electrodes that are ordinarily demanded, except for special cases. (Fig. 2.)

The surface electrode (Fig. 3), is also one of my own device, and has been successfully used by a number of operators. Over the concavity of a concave disc (*a*) of soft metal of appropriate dimensions is loosely stretched an animal membrane (*c*), which is fastened to its circumference securely enough to render the interspace water-tight, Between the concavity of the disc and the membrane, is left a space (*b*), one and a half inches in thickness, which is filled with warm water, or warm solution of salt. The

electrode is filled through a stopper on the surface of the metal; the connections are also made from this surface.

This electrode is applied to the surface of the body, so that its membrane surface is in contact with the skin, and was devised with an eye to cleanliness, to take the place of the potter's clay electrode used for the same purpose by Dr. Apostoli.

It adapts itself accurately to all irregularities, covers a large surface (400 to 800 square centimetres) and causes a diffusion of the current so perfectly, that a very powerful current can be employed with it without producing the slightest pain.

### MEANS OF GENERATING A CURRENT.

The current of electricity used for these operations should be one of high electro-motive force and small ampere strength. It should be very uniform and without interruption. Any means of generating electricity that will be practicable, and at the same time answer the above requirements, will be suitable for the purpose. I have employed, for most of my work, a battery composed of ordinary crow-foot gravity cells, sufficient in number to obtain an electro-motive force of 150 volts. The Leclanche battery is practicable for this work, and is the one employed by Dr. Apostoli; it is one of the best. Batteries of the best, however, I think will soon be replaced by the dynamo.

As long as electricity in medicine and surgery was confined to faradization and

FIG. 3.

galvanization with small currents, batteries were the most economical means of obtaining the desired effects; but now, with our growing knowledge of the importance of the galvano-cautery and the possibilities of the electrolytic current of high electro-motive force, we are forced to acknowledge the impractibility of the batteries, and the necessity of obtaining a more economical and durable means of accomplishing the same end.

In the commercial world this same problem was met with, confronted and at last solved by the perfection of the dynamo. I would not hesitate to predict as brilliant strides for medical and surgical electricity from the adoption of the dynamo, as was noticed in the commercial world with the adoption of the same means.

The machine (Fig. 4) which I have the pleasure to bring to the notice of the profession here, and which I have had constructed to take the place of all batteries, is a dynamo that will generate electricity sufficient for all purposes that are at present demanded by medicine or surgery. If the field of medical and surgical electricity, in further development, requires more energy, it can find a means to that end by simply enlarging this apparatus in proportion to its demands. The dynamo was devised and constructed by Elmer A. Sperry, of Chicago, and is now in the hands of the McIntosh Co.

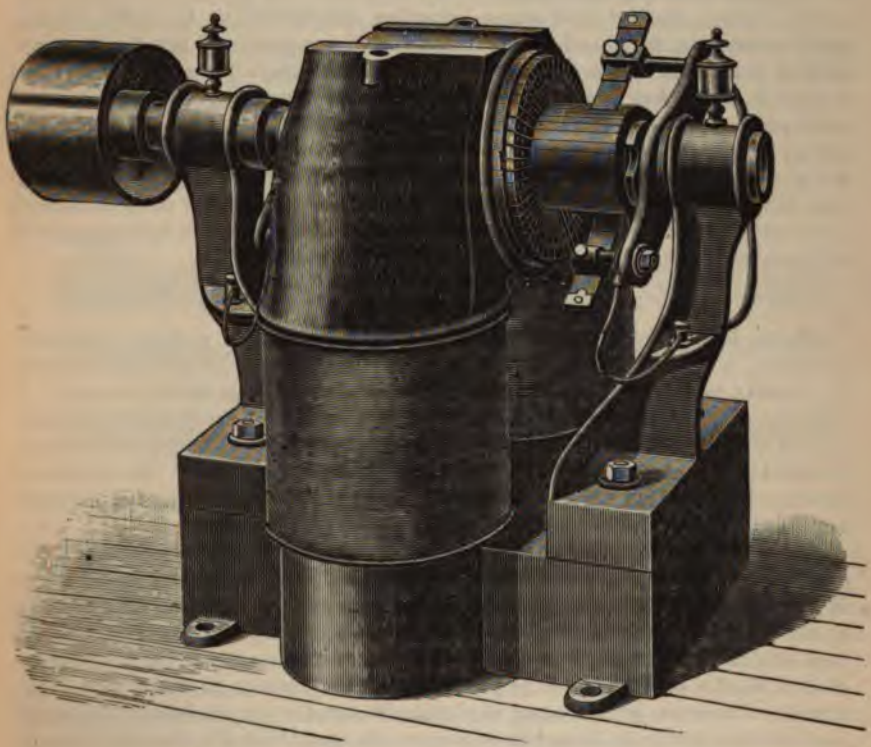
The capabilities of the machine can be brought out by one-third actual horse-power force.

The machine differs from the ordinary dynamo for electric light purposes in (1)

being constructed so as to be capable of generating two distinct currents; (2) each of the currents can be increased in gradual gradation from zero to their full power without altering the speed of the machine; (3) both varieties of current can be utilized at the same time in different work, or at the will of the operator, either one can be used; (4) the machine possesses an automatic safety device, by which the current is not allowed to reach a strength that can do harm to patient or the machine itself.

The two currents generated by the machine are identical with those generated by a cautery battery of large cells and large surface, and with that generated by a large number of small cells arranged in series, and are designated respectively, the cautery

FIG. 4.



current and the electrolytic current. The maximum strength of the cautery current is 40 amperes, with a possible electro-motive force of two volts. The maximum strength of the electrolytic current is one ampere, with an electro-motive force of 200 volts. Thus this little machine will generate a cautery current that is steady, uniform and enduring, that will accomplish the work of our largest cautery batteries made for office purposes. It will, at the same time it is accomplishing its maximum cautery work (or alone), generate a totally different current that will furnish energy sufficient to run at least one of Edison's 16 candle incandescent lights, or that will accomplish any work that can be accomplished by a battery of 150 Leclanche cells. This latter current also possesses the following advantage over cell-battery currents. In case of the cells, the current must be turned on one volt at a time, whereas, with this machine it can be evenly increased

or diminished in less graduations than the hundredth of a volt, thereby not exciting the patient in the least, while giving the full benefit of a perfectly smooth and uniform galvanic current of any required intensity.

These results are obtained without the use of a rheostat or resistance. It is also especially adapted for operating the induction coil for faradic currents, giving a very delicate adjustment of the current in the primary.

### VARIATIONS OF OPERATION.

In describing in detail this method of operating I wish to recognize two varieties: —

1st. *Positive interuterine galvanism.*

2d. *Negative interuterine galvanism.*

The variety, positive interuterine galvanism, corresponds to Apostoli's galvano-caustique positive, the second to his galvano-caustique negative. I take the liberty of making this change of nomenclature because I do not believe that a true caustic effect is what we should seek to obtain. With the negative pole we get free escape of liquid and hydrogen gas from the surface beneath the electrode, from powerful electrolytic action, and a condition is produced that will stimulate rapid absorption, but it should not be carried to the extent of local destruction. With the positive pole we get active coagulation of the albuminous particles of the tumor by action of the acid radicals produced by rapid electrolysis. The concentration of the currents, however, should not be so great as to cause actual destruction of the tissues.

### MODUS OPERANDI.

*Positive Interuterine Galvanism.*—The first variety of operation, positive interuterine galvanism, is indicated in that large majority of fibroid tumors that presents a history of excessive hemorrhage. This condition is present in a large variety of cases. It matters not if it be the small submucous, the larger interstitial, the large subperitoneal, or even the large-base pedunculated tumor, the indications for treatment are the same, if there is a flow of blood from the mucous membrane of the uterus. The uterus may also vary in depth from 7 to 20 centimetres without changing the indication for treatment, or lessening the chances of success.

The operator proceeds, after the patient has been instructed to assume a convenient position, to discover the whereabouts of the cervix and endeavor to ascertain, by means of a uterine sound, the depth and direction of the canal. This is the most difficult part of the operation, oftentimes, because of the extreme distortion of the canal. I have been obliged, in a number of cases, to postpone treatment from day to day for a number of days, because of being unable properly to adjust the electrode in the uterine canal. I have yet, however, to find a case in which, after more or less persistence, I have not been rewarded finally by being able to traverse the canal with the flexible electrodes that I have described; after once accomplishing an entrance, and learning the peculiarities of the canal, the future introduction of the electrode becomes an easy matter. At the first treatment the electrode of proper diameter should be selected and inserted to the bottom of the uterus, and connected with the positive pole of the battery. Upon the surface of the body, attached to the negative pole, should be placed the passive membranous electrode (Fig. 2), in a position that will cause the electricity to traverse the largest mass of the fibroid. After the connections have been well examined, in order to insure their security, and the insulating muff (Fig. 5, *a*), has been slid up to the cervical point and fastened, the current from the generator is turned on very gradually until a current of 50 milliamperes has been reached, if the active surface is 2 sq. cm., and 100 milliamperes if the active surface of the electrode is 4 sq. cm. The current is then allowed to pass for five minutes, when it is gradually reduced until it is entirely

turned off. The electrodes are then carefully removed and the application is finished. This first operation produces a coagulation of two or four centimetres, according to whether the active surface of the electrode occupied two or four centimetres of the distal end of the uterine canal. When the internal electrode is withdrawn the depth of the uterine canal is noted or indicated by the position of the muff, and the fact, together with the diameter of the electrode, is carefully recorded in the records of the case for that day. At the next application, which can usually be as soon as the next day, before introducing the same electrode, the interuterine portion of the instrument should be shortened, by setting the rubber muff or gauge just the number of millimetres nearer the distal end as the active surface of the electrode measures millimetres in length. Upon introducing the electrode into the uterine canal now, as shortened by the position of the muff, the active portion of the instrument will reach exactly to the point that was acted upon at the previous application. It can readily be seen that in this second operation another portion of the canal has been treated. This same procedure is continued every day, with a change of the gauge every time, until the whole canal has received the action of the metal portion of the electrode. This line of treatment (the galvano-negative) should be thoroughly carried out the four or five days immediately preceding the regular time for menstruation to appear. If the patient exhibits an indifference to the effect of a 50-milliampere current the work can be done in half

Fig. 5.

the time and just as well by substituting the electrode of 4 sq. cm. in surface with the 100-milliampere current.

As I have intimated, the positive interuterine galvanism should be employed the week preceding the regular menstrual flow. If, as in a large number of these cases, the hemorrhage has lost its regular periodicity, or the hemorrhage is continuous, the judgment of the operator should guide him in selecting a time when the hemorrhage is not present, or when there is the minimum amount. If, however, the hemorrhage is continuous, the treatment must be given during the flow.

*Negative Interuterine Galvanism.*—The second operation, the negative interuterine galvanism, can usually be performed with the 100-milliampere current, unless the patient is particularly susceptible to the effects of electricity. In this operation, the interuterine electrode is carefully introduced to the bottom of the canal, as in the first operation, but is connected with the negative pole of the battery instead of the positive. The surface electrode is properly arranged, and after all connections are rendered secure, a current of 100 milliamperes is gradually turned on and allowed to work for five minutes. Of course, if the surface effects of tho 100-milliampere current is at all disagreeable, the electrode requiring the 50-milliampere current should be substituted, and the 50-milliampere current employed. The same procedure should be adopted in regard to changing the position of the active surface of the electrode, in order to accomplish the characteristic action on all portions of the canal.

I wish to insist, right here, that every antiseptic precaution should always be carried out with great care in either variety of operation. I am in the habit of inserting the

internal electrodes in ninety-five per cent. carbolic acid, and thoroughly cleansing before each application. Strict cleanliness is imperative.

The effect of this operation is to produce rapid reduction in size of the growth, and it should be employed in the early days of the month following a menstrual period, and should always be followed later in the month by the positive interuterine galvanism, in order to prevent the excessive hemorrhages that would otherwise occur at the following menstruation. This latter operation can readily be tolerated every second day, and very frequently every day.

In these two simple procedures here presented, we have a safe, painless, accurate and rational method of treating fibroid tumors of the uterus by Apostoli's method. By this method all the beneficial effects of electricity can be obtained, without in the least endangering our patients by any of the possible evils that we are able to discern in other methods. It has been shown that the maximum current advised, one hundred milliamperes, by proper condensation will do exactly the same work locally and with more certainty than currents of much higher intensity, that are employed without taking into accurate account the extent of the active surface of the electrode. The atrophic effect of the current is more liable to be obtained when there is a systematic condensation of the current, at successive applications, to the whole internal surface of the uterus, and, therefore, through all portions of the tumor at different times, than when a much stronger current is employed indifferently diffused through all portions. For the same reason the electrolytic effect of the current becomes more certain and effectual when the current is concentrated, than when it is indifferently diffused. The anti-neuralgic effect of the current is obtained almost invariably with this method, although this particular procedure offers no advantage in this respect over any other.

In recommending this gradual process of treating these difficulties I do not do so because of any great advantage that I expect to obtain from lessening the strength, on account of the pain, but because of the more accurate application and the more definite results that are obtained with smaller surface of concentration. I have had a large experience with Apostoli's method, and have employed much stronger currents than he has advised, without producing excessive pain, but I found it was not always possible, even when the greatest precautions were taken, to avoid uneven work.

In conclusion, the principal advantages of this method can be summarized under six headings:—

1st. It is entirely free from danger.

2d. It is absolutely painless.

3d. It invariably checks excessive hemorrhages.

4th. It rapidly reduces the size of the tumors.

5th. It stops neuralgic pains.

6th. It is a system of treatment of fibroid tumors of the uterus by electricity, based upon principles which make exact dosage possible.

Dr. ALFRED C. GARRATT, Boston, Mass., read a paper on

## TUMORS OF THE FEMALE BREAST REMOVED BY MODERATE CURRENTS OF GALVANIC ELECTRICITY.

### TUMEURS DE LA GLANDE MAMMAIRE ENLEVÉES PAR DES COURANTS MODÉRÉS D'ÉLECTRICITÉ GALVANIQUE.

### GESCHWÜLSTE DER WEIBLICHEN BRUST DURCH MÄSSIGE GALVANISCHE STRÖME BESEITIGT.

Most or many of the tumors that so frequently occur in the human breast we find can be completely cured *if treated while young*, that is, while in their first or early stage of existence, by certain mild applications of primary electricity.

Of course, each one of all those cases of cancerous and other tumors in the female breast that usually go on to the knife, or to caustic destruction, or to the death of the patient, has an *early* existence that heretofore rarely came under the observation of the physician or surgeon. It is well known that a woman will almost invariably hide the newly discovered lump in her breast for a long time, even from her most intimate friend. No doubt this is owing to the very general impression of a certain *doom*, or an absolute necessity for a surgical operation, which she hears is attended with uncertain results, though often due to the delay. For this reason, too, some of these cases flee to the cancer quack, who promises a certain cure from only applying his wonderful plaster. Whereas he at once attempts to eat it out with herbs and arsenic, caustic, or other extremely painful process and so bungles it over until precious time is wasted away. The most of these being aggravated, entail untold sufferings, become malignant, if not so already, and prove fatal.

In the first place, then, in order to obtain anything like uniform success by this new method of treatment, we must seek to find the tumor in the human breast *early*, while it is in a curable stage, in the large majority of cases. To this end it is then all important to bring about an entirely new impression among women generally, so as to break up their habit of hiding the breast tumor. They should be thoroughly impressed with the idea that all such tumors *are not at first* necessarily malignant or fatal. They must know and feel the exceeding great danger there is in putting off from their family physician the knowledge of the very first appearance or existence of any sort of lump in the breast, even for a week or a day. Also, they should be encouraged to expect, in the majority of cases, to be completely cured, not by surgery, nor in experiment, but by the regular physician or surgeon, without pain, ether or wound, from applying only gentle and safe means which has never been known to drive the disease to any other part of the system, and that surgery here is reserved for only the few older, malignant and otherwise incurable tumors in the breast.

However, we already know that we cannot assume that *every* morbid lump that grows or appears in the breast gland is from the first a simple or non-malignant tumor, though the most of them seem to be, judging from the generally successful results of these treatments by moderate electricity when applied to the selected *new* or recent tumors.

There came to my office an elegant and very healthy appearing lady, of large development. She had just discovered a tumor deep down in her left breast, shaped like a pan-cake or a plano-convex lens, some three or more inches in diameter, and yet not very clearly outlined, for it seemed to involve nearly the entire base of the breast, and was firmly attached to the pectoralis major muscle. The nipple was already attached to the tumor and drawn down more on one side than on the other, which made

a deep groove in the skin at its base. When the nipple was righted up it was painful to her for the first time and a moisture exuded from the crack. It showed its malignant character also by the wrinkled skin over the whole breast and by the gnawing pains that now came and went like increasing and decreasing waves, as she expressed it, though she had not been aware of its existence until three or four days before. Her first notice of it was caused by a sudden sensation as if milk was flowing into the breast. She was thirty years of age and had been a mother. This case was at once referred to her friend, Dr. George Gay, who thoroughly removed the whole breast. The disease soon re-appeared in the axilla, which was also operated upon by him, but it reappeared inter-pelvic, and she died of it about a year after.

When we are fortunate enough to find the young tumor in the breast, still we have then need to examine its nature. No matter whether small or large, flat or round, a schirrus or congestion, a mere hardening of the milk ducts or otherwise, it should be carefully examined. In order to be suitable for this treatment, or this treatment for it, it must be *curable*, that is, it must not be firmly attached at its base, nor have soft or puffy nodules nor wrinkled skin over it, nor deep depressions over it in the gland. That is, it must not show an *evidently* malignant character, for we do not propose to cure sarcoma nor carcinoma, nor any sort of cancer of the breast; but we can cure nearly all other morbid growths therein. .Three of the successful cases here reported were in the male breast, each caused apparently by a punch or a bruise.

Sufficient. In the presence of so many expert and skillful practitioners it would be presumption in me to attempt to treat this subject in all its bearings. However, permit me to say further that here we are obliged to select the form of electricity and the method of its use as carefully as we seek to find the curable cases. For we must not resort to the electro-cautery as usually employed for tumors elsewhere, as by electro-puncture needles, knife or wire, nor to any other *destructive* electrolysis, or other means that produce solution of continuity. But rather simply to so employ surface applications of moderate primary *i. e.* galvanic currents, as to accomplish deep work. For this we use broad, soft and moist electrodes, which, being metallic, are faced with cloth, or thin, fine sponges. *These are adjusted each side of the tumor and close to it*, so as to cause this chemical current to completely pervade and wash through and through the whole mass from side to side, in various directions, but mostly toward the axilla, for about twenty or thirty minutes at each séance.

The two electrodes for this work should be large, oblong and slightly oval, at least two by three inches (six by nine centimetres), and well wet with warm water only. It is not sufficient to apply these electrodes to the breast in any manner. They must closely and completely embrace the whole mass, even its deeper parts, between the positive and negative poles as much as possible. For this work we need to use a primary battery of some twenty or thirty small cells, such as the bichromate of soda cells, or the portable Stöhrer battery, or the improved Daniell's cells, in good working order, and so connected in single tandem series with the key-board that the current can be gradually picked up, cell by cell, to the required or bearable strength. Whatever the battery strength of current employed and tolerated by the patient, we need to use a galvanometer to indicate, or a milliamperemetre *to measure the current that actually passes through the tumor while operating.* This we find ranges from five to fifty milliamperes; showing that but a fraction of the whole battery current applied is passing through, owing to the many ohms resistance from electrodes, cuticle and tumor.

For each case, the number of cells or precise strength of current to be employed cannot be stated in exact terms, because in practice we find there is a wide difference in the resistance, tolerance and effect, in different individuals; yet this point is very important, and can be attained. If the current is too weak there is little effect; if too strong it proves painful to the patient, or blisters the skin, or it may congest the tissues

and so hinder the desired process. The aim should be to make a painless and very active physiological and chemical action, a gradual and moderate electrolysis and catalysis, together with a change in the vasomotor nerves, the blood and vessels, the parenchyma of the gland and the absorbents.

In practice we find some cases require or can take only five or ten cells, while others are but duly affected by twenty or thirty cells. But there are indications and aids besides the galvanometer instrument that will guide us. The effect on the patient must be first observed ; then the effect on the skin can be watched, if every minute or two one of the electrodes is tilted up a little so as to see under it and yet not break the current. If the skin is becoming very red, or the sensation is not only warm but hot or burning, then the current must be reduced, or the electrode must be glided along a little to a new site. Nor should the current even be broken while operating, as at a binding screw or the key board, for the shock of it is disagreeable to the patient and makes soreness in the gland. Maintain the action for at least twenty or thirty minutes at each sitting. Repeat it daily, or every other day or so, according to effects produced.

If the given lump or tumor proves unimpressible, it is well to finish each sitting with an interrupted extra, that is, one way current, or the electro-magnetic current of very fine vibrations and moderate strength, for two or three minutes. Moreover, the whole work in such a case can be hastened on by prescribing iodide potassium or ergot with chloride of ammonia, and ordering an application over and about the tumor, every night at bedtime, of half strength citrine ointment, mixed with lard, the size of a pea, well rubbed in. Or the ung. hydrarg. ammo. ℥j, with oil lavender, ʒj. Anoint the whole breast and cover with warm, wet compress for the night. Some of these tumors obliterate at once under three or four applications of electricity, while some others require twenty or thirty applications. This method is found also to cure scrofulous tumors of the neck, also white swelling of the knee, and some ovarian tumors in their earliest stage.

Finally, the result is, out of 186 tumors in the breast so treated since 1864, a record of them having been kept and inquired after, 157 were completely cured and have remained well. Several others, however, did not quite obliterate, for there remained a small nodule as large as a hazel nut or more, which in every case afterward disappeared or remained benign. Two of them were removed by the scalpel, because these two ladies became unhappy from their presence; the larger nodule by Dr. H. O. Marcy, and the other by Dr. Charles Homans. No recurrence of any of these tumors ever appeared, so far as could be ascertained. But the writer has had four new tumors to treat in four of these women, which evidently had an entirely new cause for origin. One appeared to be caused by a broken whalebone or a steel rib in the corset that chafed the under part of her breast, where the tumor soon after appeared. One was caused by the rough hem of a suspender strap that was worn to sustain the skirts, which though crossed on the back, passed down in front, directly over the nipple and breast, making them feel sore, and here I found an ugly tumor. The other two cases came from bruises, the one by striking the breast in the dark against a corner of furniture, the other from being thrown from a carriage. These all came for treatment, and all recovered.

Dr. F. SEMELEDER, Mexico, presented the following paper:—

## ELECTROLYSIS IN UTERINE FIBROIDS.

### ÉLECTROLYSE DANS LES TUMEURS FIBREUSES DE L'UTÉRUS.

### ELEKTROLYSE BEI UTERUSFIBROMEN.

I promised to send a report of a few cases of uterine fibromata treated by electrolysis, with various but altogether favorable results. Though the number be small, I will publish them, because Dr. Cutter's, as well as Dr. Apostoli's work is so important that every one who is able to contribute observations is in duty bound to do so. If several operators publish only a few cases each, they will, nevertheless, form an aggregate and allow us to draw conclusions.

During the last ten years I employed electricity in such cases oftener than I can describe it now, for some of my patients were operated upon in a small hospital for female diseases, or in private practice, only once generally, and then lost sight of; however, if I am unable to give accounts of ulterior results, I am allowed to state that in no one of these cases any unpleasant effects have been noticed. In one of them, Dr. Martinez del Rio, who was then the director of the hospital, and myself, diagnosed a hard tumor adhering to the anterior abdominal surface of the womb, in a woman of about thirty-five years of age, and decided to perform Cutter's operation. As soon as the first electrode was introduced, a small quantity of a thick, dark-brown liquid began to ooze out, convincing us that we had to deal with a cystic tumor, for which this method was not convenient; so we withdrew the instrument, applied a compression bandage and proper antiseptic treatment. No bad incident followed, and some time later the woman left the hospital with the cyst somewhat diminished in size.

The cases of which I am able to give more circumstantial reports, are but six, viz:—

1st. A woman of forty-eight years; suffering from hemorrhage and menstrual disorders many years. She had only one child, now eighteen years old. Various operations had been performed on her, as cauterizations with nitrate of silver and with the actual cautery, ablation of the cervix, and one with Sims' curette, for fungous metritic fibroid tumor in the anterior wall of the womb, on its left side. I twice performed Cutter's operation on her; the tumor, the size of a pineapple, since then remained stationary for the last two years; hemorrhages continue abundant for eight or ten days every month. I intended to apply the curette again, as she passes every month a greater or less quantity of fungous growths, but was unable to do so, as the fibroma compresses and twists the cervical canal, and allows no instrument or sponge tent to pass, to dilate the compressed and narrowed canal.

2d. Woman, fifty years old, single; severe, almost continuous hemorrhage; intermural fibroma, size of two heads; some pain; compression of bladder and blood vessels; œdema of left leg. Cutter's method twice applied; bleeding less; the tumor not very hard, keeps on growing slowly.

3d. Woman, thirty-eight years old; three children; fibroma size of the head of a man; hemorrhage for a fortnight every month; dull pain; œdematous swelling of left leg. Gave Callaud battery, one pole on the abdomen, and one on the cervix, twice a week for three months; current marks 30 to 35° on the galvanometer, when the poles are applied, 30 minutes every time; the tumor stopped growing and the period became less irregular, lasting five days every month. Lost sight of.

4th. Single woman, forty-three years old, anæmic; monthly flow abundant but regular as to time and duration. Eight months before I saw her she noticed swelling of abdomen, and at the time of my first visit offered the following measures: Dullness

of sound and hard tumor, from the symphysis upward 28 cm.; circumference of the stomach, 5 cm.; below the navel 77 cm.; tumor occupying the right side of the stomach; in the highest part of the tumor there is a bony, hard body and a painful spot. Cervix horizontal, pointing to the left; uterine probe will not enter. Bimanual examination shows that the womb and tumor form one single body. Several spells of chronic peritonitis; ten percutaneous applications of Cutter's battery; tumor softer. New attack of peritonitis; treatment suspended for ten days. Then thirty-three applications of a great electrolytic battery (Callaud's pattern), alternating with local faradization. Tumor has not grown more since, and is softer; general symptoms relieved.

5th. Single woman of forty years. Two years ago she began to notice a hard lump growing in the left side of her lower abdomen next to the womb. Sub-peritoneal fibroma, now the size of a pineapple, pressing on the bladder and rectum, and causing manifold inconvenience. Hemorrhage abundant and almost constant. Thirty-nine applications of my electrolytic battery, 30 to 35°, one pole on the abdomen, and the negative through the rectum; 30 minutes each séance, changing the direction of the current after 15 minutes. The tumor has decreased in size, and last month, for the first time for years past, the menstrual flow came, after an interval of twenty-one days, and lasted only five days.

6th. Woman of forty-five years, married, no children; suffering from the womb quite a number of years; fibroma occupying the whole womb, reaching three inches above the navel; metritis fungosa. Different kinds of treatment tried previously, on account of severe hemorrhage. Now and then fever and pains in the abdomen (chronic peritonitis); many general symptoms; cauterizations, Sims' curette, etc.

Electric treatment begun in January; great battery of 24 carbon and zinc elements; seldom was the whole battery applied; twice a week, negative pole applied to the cervix and positive on the abdomen; large metallic shield over a patch of blotting paper moistened in salt water. Measures taken in January, from one outer super-spinous process to the other, 50 cm.; in June, 35 cm.; size of tumor decidedly less; stomach evidently smaller; patient feels lighter and livelier; hemorrhages diminished. 40 applications in five months, half an hour each, changing direction of the current after fifteen minutes. Treatment to be continued.

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Dr. EPHRAIM CUTTER, New York City, read a paper on—

## GALVANISM OF UTERINE FIBROIDS.

### GALVANISME DES FIBROÏDES UTÉRINES.

### DER GALVANISCHE STROM BEI UTERUSFIBROIDEN.

*Introduction.*—Placed as a pioneer, I am in a position to review the history of this operation and draw conclusions therefrom. The time seems to have come for this to be done.

While a deeply interested participator, I propose calmly and dispassionately to treat the subject on the basis of facts, giving opinions only where it cannot be helped, preferring that the reputation of the operation be based upon the character of the facts

rather than on opinions. All will meet with due respect and credit, as the great end of the matter is the relief of sufferers, the honor of gynæcology and persons being secondary.

### EXPECTATIONS.

When, on August 21st, 1871,* the first American operation was performed, the expectation was *only to arrest the development of the uterine fibroid.* And this expectation was held in spite of the positive assertions of the medical gentlemen who may be said to have been at the head of their specialty in electricity. They affirmed that no good whatever could come from the proposed operation. On being asked if they had tried it, they said "no." I said then that I would try it, regarding the opprobia medicorum as a fair field for any to explore who had a sincere desire to remove said opprobia.

### HOW THE FIRST OPERATION CAME TO BE PERFORMED.

About 1870, I provided myself with the best galvano-cautery apparatus (Stöhrer's pattern) I could find. for use in the treatment of diseases of the throat. In 1871 the Middlesex (Mass.) East District Medical Society met at the house of the late Dr. John Clough, of Woburn. At this meeting I showed this battery and its action on water, beef steak and mineral salts. The next day Dr. W. Symington Brown, of Stoneham, Mass., came to me and said that Mr. Robert Pierce, of Melrose, Mass., had a wife who was suffering with a uterine fibroid; that he had been in the U. S. Army under General Kilpatrick, whom he had lately seen at a public lecture the General gave in Malden, Mass. (I think); that the General inquired after his family, and being informed, told him about the cure of his own (the General's) tumor in his neck, at one sitting, by Dr. R. P. Lincoln, of New York) see *New York Medical Record*, December 15th, 1870, Vol. v, No. 20); he suggested that Mrs. Pierce should receive like treatment, saying that the cured tumor was angiomatous.

"Now," said Dr. Brown, "you have the means to do it, will you try?" I said that I was willing to try, if, having seen the patient, I could feel justified, and added that I did not think uterine fibroids were as amenable to the galvanic current as vascular growths.

The patient was carefully examined, with the result that a day was set for the operation, which was done August 21st, 1871, in the presence of Dr. Brown and others. No anæsthesia. An electrode, made of a small needle, and about four inches in length, was introduced into the uterus per vaginam, where the tumor was round, hard, and plainly felt. This account is different from that of Dr. W. S. Brown, which was reprinted in the *American Journal of Obstetrics*, New York, February, 1887, page 120, who speaks of three needles being used. I am sure there was only one. Over the pubis was a sponge electrode. Fifteen minutes' current. The needle could not be introduced over one inch, and that with great difficulty.

After this operation I proposed to Dr. Gilman Kimball that we join in this matter. He is a man much older than myself, an accomplished, bold and brilliant surgeon, and the greatest living American ovariotomist, being noted for his original procedures in this specialty.

He was present August 29th, 1871, with some eight or more physicians, when we operated on Mrs. Pierce the second time, using a needle of platinum, which twisted and turned in his hand and gave great dissatisfaction to all. Dr. Kimball was disgusted, and said he would have nothing to do with the operation unless better electrodes were produced, that would penetrate surely a fibroid as hard as a bullock's testicle. At once I invented a needle, of steel, shaped like a corkscrew, with the convolutions gold plated.

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*See *Medical and Surgical Reporter*, Phila., February 8th, 1878. W. S. Brown, Reporter.

This did not work, and I then brought out the so-called "Cutter needles," which were made so as to cut and at the same time relieve the tension of the tissues, which bind when penetrated by a needle of a cylindrical shape, and strong enough to avoid the risk of breaking off and being left behind in the fibroid. Whatever has been or may be said of these needles, they were satisfactory as to penetration, and never failed save when they encountered a calcareously degenerated fibroid.

Moreover, without these Cutter needles, the present history of galvanism of uterine fibroids would not have existed.

In order to make sure work it was determined to use two or more needles, plunged deeply into the tissues of the fibroid, through the abdominal walls, with a battery large enough to create a positive and tangible amount of galvanic current. It was decided that if the operation was a failure, there should be no doubt about the failure, and thus secure valuable *negative* results, which are as important as positive ones, sometimes. To repeat: *the main expectation in galvanism of uterine fibroids was the arrest of development.*

Remember, most of the cases operated on were of fibroids, large, hard, many-lobed, extra-uterine and intra-uterine, packing the pelvis, filling the abdomen, occurring in cases of bad general health and complications, such as abscess, ovarian tumors, opium eaters, etc. The worst cases received the applications as well as the most promising.

### REALIZATIONS AFTER SIXTEEN YEARS' LAPSE OF TIME.

Truly can it be said "the unexpected happened;" for besides *the expected arrest of development*, in a large part of the cases there have been realized—

1. In some entire cures.
2. In some great diminution of the growths.
3. Relief from pain and hemorrhages in the large majority of cases.
4. Attention to the operation by members of the medical profession of eminent character.
5. Counting in all the numbers reported of cases that I can get hold of, there must have been over four hundred cases of applications of galvanism to uterine fibroids, while the unreported cases probably increase this number by scores.
6. Another realization has been the variations from galvanism to faradism, in the mode of application, in the batteries, in the duration of applications, the number of applications, the kind of electrodes used, and the discovery of instruments to measure the current by milliamperes.
7. The operation has been widely published and has become pretty well known.
8. The time seems to have come when uterine fibroids are no longer "opprobia medicorum." These results promise better things for the future, when our knowledge shall be more perfect and complete.

### ANSWERS TO CRITICS.

These have been so many and unfavorable, that it would take a volume to record them. I will mention a few, as matters of history, in a syllabic way, so far as they relate to the writer's procedure:—

1. Criticisms *before the operation.*
   (*a*) "It is of no use to do this operation."
   (*b*) "Your battery will not answer."

*Reply.* See the eighth realization.

2. Criticisms *after the operation.*
   (*a*) No current; results produced by puncture alone.

*Reply.* "Then treat the cases by puncture," I said, but none did have the courage

to operate on uterine fibroids by simple puncture, as was done by galvano-puncture. Hence facts were answered by opinions not based on facts; this is not a demonstration.

"No current." The late Dr. G. M. Beard, of New York, and Dr. David Prince, of Illinois, both proved there was a current by galvanometer. Earlier, Dr. A. C. Garratt, of Boston, and son, spent one thousand dollars in getting up a voltameter which proved there was a current.

Galvanism does many other things besides deflecting the needles of a voltameter.

These historical matters now are of no account save to show how critics, without having seen a case operated on, environed the pioneers with not very encouraging surroundings. They illustrate, also, the aptness of the subject of Dr. Sims' first boy composition—"Never to give an opinion as to anything you have not tried."

(*b*) Dr. Engelmann, at the 1886 meeting of the American Gynæcological Society, said, " . . . By puncture through the vagina, possibly through the tissue of the uterus itself, you avoid most decidedly the dangers of peritonitis, which must accompany the abdominal puncture." Page 370, lines 18–21, *Transactions of the American Gynæcological Society, 1886.*

*Reply.* This gentleman's dictum represents the conventional thought as to all punctured wounds of the abdomen. This thought is changing, due to the advance of modern surgery. If the dictum was put less positively and less universally, the position would be more tenable; for when it is shown that such abdominal punctures have been made and followed *not* by peritonitis, the dictum falls before a fact to the contrary; such has been the history of the operation. Had the dictum of this critic been qualified, there would have been another way to answer it. Critics must be met on their own and not on other grounds.

(*c*) *Abscess.*

*Reply.* These have been so rare as to disqualify any statement that represents their constant occurrence in this operation; in truth, as before stated, cases complicated with abscess have been operated on.

(*d*) *Deaths.*

*Reply.* Four cases out of fifty has been the rate, and some of these occurred when the patient disobeyed orders. A death rate of thirty-three per cent. is no bar to an operation in some other departments of surgery. If this operation is debarred on a mortality of four out of fifty (though, as noted, two were due to carelessness, one was a morphia eater, and the fourth would have the operation at any risk), then capital operations should be unperformed.

(*e*) *No measurement.* No operation without a measurement.

*Reply.* The results show successful operations without a measurement by amperes, volts, etc. If the end of this operation was not the relief of the patient, but measurement, the criticism would hold.

When the first operation was done, the state of things was much different from that of to-day, when amperemeters and voltameters are common, owing to the extended popular use of electricity, and there is more ground for the criticism than then. But to insist that galvanism cannot be applied to a uterine fibroid without a milliamperemeter is to go back on facts. It is not claimed that the milliamperemeter does the work, it merely measures—measuring a work does not do it.

I am not arguing against the use of measurement; I early took to Professor Moses G. Farmer, of Boston, then the best practical electrical authority, my battery, to be measured. He said that he had no instrument large enough to do it. Next, about 1877, Dr. A. C. Garratt and son (who is a mechanical electrical expert), unknown to me, set to work to measure my battery, and at an expense, as before noted, of one thousand dollars, produced a galvanometer which registered 1.70 volts. This instrument was intercalated in a current that ran through an abdominal fibroid, both needles inserted, and the registering needle struck the terminal pin at 1.70 volts. Showing

that as much if not more than 1.70 volts traversed the tumor. Dr. Garratt published, in the *Southern Clinic*, Richmond, Va., January, 1879, a paper entitled "Electricity Employed in a New Method in Gynæcology," and read before the Gynæcological Society of Boston, June 13th, 1878, to which the attention of those interested is referred. *Later*, Dr. G. M. Beard, of New York, and Dr. David Prince, of Illinois, came out with reports of measurement.

WHAT ARE THE MEASUREMENTS OF ELECTRICITY?

Electrical units adopted by the British Association. The fundamental units adopted are based upon the centimetre (length), the gramme (mass) and the second (time); or, as it is sometimes called, the C. G. S. system. For practical units the following are adopted:—

*The Ohm*, as the unit of resistance, is that of a column of mercury having one square millimetre of section, and of a length to be hereafter determined by a commission specially appointed for that purpose. The length is supposed, however, to be between 104 and 105 centimetres. (Said to have been settled since.)

*The Volt* as the unit of electro-motive force. This corresponds to nearly that of one Daniel cell—the standard Daniel cell has an electro-motive force of 1.079.

*The Ampere* as the unit of current; which is the current produced by one volt through the resistance of one Ohm.

*The Coulomb* as the unit of the quantity of electricity; which is defined by the condition that an ampere yields one coulomb per second.

*The Farad* as the unit of capacity; which is such that one volt in a farad shall give one coulomb.

The volt acting through an Ohm gives a current of one ampere; that is to say, one coulomb per second; and the farad is the capacity of a condenser which holds one coulomb, when the difference of potential of its two plates is one volt.

*The Watt* as the unit of power, being the power possessed by a current of one ampere in one second, through a conductor whose ends differ in potential by one volt.

*The Joule*, as the unit of work or heat, being generated by a Watt in a second. The Joule bears much the same relation to the Watt that the ampere bears to the coulomb, the Watt being the power to do a Joule of work."

Here are seven units of measurement to choose from. Apostoli and others insist on the ampere, or rather the milli-ampere, which are measures of quantity, the thing I was after at the outset.

But what am I to do when I have two batteries, one of nearly thirteen square feet of surface, and the other of one-eighth the amount of this surface, and both measuring the same amperes and volts? And yet trials of experience tell that the work in relieving patients is much better with the large battery, so that I prefer to be annoyed with the discomforts of the great weight of it and its cell.

There are other things that galvanism does besides overcoming resistance, in depositing metals and decomposing salts and tissues.

For example, to mention no more: "Foderé showed that galvanism influenced the rapidity of imbibition. He injected a solution of the sulphate of iron into the peritoneum and a solution of potassic prussiate into the pleura of a living animal. Ordinarily, five or six minutes elapsed ere the result was manifested, *but when a slight galvanic current* was passed through the diaphragm, the combination was instantaneous.

"The same results obtained when the reagents were thrown into the bladder and abdomen, or into the pleura and lung." See *Alabama Medical and Surgical Journal*, May, 1887. Endosmosis: E. Cutter, 1856.

It seems to me that this quotation sheds light on the subject. Galvanism does more than these things. For example, I passed one electrode through the right groin into a hard, obovoid fibro-myoid, and another electrode into the uterus, per vaginam, of a

morphia eater, and passed the current of the smaller battery named for ten minutes, and in the course of a year the whole tumor disappeared. There was something done more than is registered by the units of resistance named above. If such results were constant, they would be units of therapeutic measurement.

Those who carefully read over our reports, will see a relation simply of the facts as they happened. We do not dictate to others what they shall do, but are glad if they have done, or will do, better than we have in this new field of work.

We honor and give due credit to all workers, but if any one, in time to come, galvanizes a uterine fibroid, we will not bar him out if he does not use a milliamperemeter, for the simple reason that such cases have been cured without a measuring instrument. Those who claim the operation as their own invention, ignoring the work of Dr. Kimball and myself, are welcome to do so, if they choose to occupy a false position.

### CRITICISMS OF DR. APOSTOLI'S ARTICLE, "TREATMENT OF FIBROID TUMORS OF THE UTERUS BY ELECTRICITY, WITH STATISTICS." "NEW YORK MEDICAL RECORD," AUGUST 13th, 1887.

Read to the British Medical Association, Dublin, August 2d, 1887.

Page 177, column 1, line 32. "I may, first of all, point out what my predecessors have done in the electrical cure of fibroids. Apparently they have used a current of electricity, but all attempts made were defective in ways that I may here recapitulate.

"The current of electricity was employed (1) in a vague and variable manner. Sometimes there was faradization; sometimes there were continuous currents; sometimes interrupted galvanic currents, but always without a definite object."

*Reply.*—Now this statement is untrue, so far as relates to my procedure, which always excluded the faradic current and interrupted galvanic current, mainly on the diction of the late lamented Dr. Louis Elsberg, of New York, "That when electricity did good twenty times, galvanism benefited nineteen times, and the faradism one time."

But our author, loco cit., page 179, column 2, line 60, speaks of publishing a separate memoir on the faradism of uterine fibroids, which I am very glad to know and am anxious to see, but which dulls the edge of the criticism he makes when he states that his predecessors, by using sometimes galvanism and sometimes faradism, went in "defective" ways; he has done the same thing himself. So, if they were defective in their ways, he himself is so, by his own showing, and thus makes void his criticism.

"But always without a definite object."

*Reply.*—As has been stated above, there always was a definite object, *i. e.*, "The arrest of the growth of the fibroid."

The largest, most hopeless, and rapidly increasing fibroids were attacked with one of the largest batteries ever used on a human being. The applications were made by profound punctures, through the abdominal walls, of the peritoneum, to repeat, *purposely*, so as to be sure that the current traversed the tumors, and them alone definitely. This is not saying it in the best way, but it is *my* way, and the purpose is and was as definite as if one planted his fist into a bully to stop the development of any more bluster.

Again we quote, as above: "The current was set in motion in ignorance of its intensity, and with imperfect knowledge of the best means of employing it."

*Reply.*—If, by intensity, he means the registration in amperes or milliamperes, I state that there were none in 1871. Volt meters existed which measured electro-motive force. Does the gentleman mean that we ought to have used an instrument in 1871, when the proceeding was inaugurated, that was not in public existence till 1879, if I am correctly informed? If so, he requires more than any man could do; hence the fallacy of the criticism.

"And with imperfect knowledge of the best means of employment."

This is a lame criticism.

When the first operation was performed, I confess the knowledge of the best means of electrical employment was imperfect; nor is my knowledge perfect now.

The gentleman's remarks, page 179, column 1, show that he regards his knowledge as imperfect, and yet he had the benefit of the experience of his predecessors, which I had not. There was absolutely nothing to guide me, for the simple reason that I had not seen nor heard of a case of uterine fibroids operated on by electricity. Worse than this, I was told by medical electrical experts that "it could not be done." May it be said here, that this utterance spurred me on to undertake the operation, and helped me to adopt the means that were used, as I thought that the operation should be performed, and, that if it failed it should not be from the lack of thoroughness. I tried to have the results so marked as to be of value *negatively*, if it failed.

Dr. Apostoli's criticism is fallacious, as there could not but be imperfect knowledge of the best means of employing it, for the simple reason that no means whatever had been used, to my knowledge, when we performed the first operation.

Daniel Webster once said of a man who erred, "I would not give a cent for a man who never made a mistake." To err is human, not to err is divine.

Line 45. "The proceeding was purely empirical, discrediting a certain agent capable of doing much good or none at all, according to the skill and intelligence with which it was directed."

*Reply.—Purely empirical.* Is this as bad as it seems? If so, we have lots of terrible fellows among us who have been trying things empirically all their professional lives; for example, one has tried "kerosolene" by inhalation for the first time. Without a tracheotomy tube, he tried laryngotomy for the removal of a voluminous growth from the larynx of a woman in 1866. She speaks and sings now. McDowell tried ovariotomy; Norwood, veratrum viride. The medical profession are all the time trying things empirically, and God bless them for it. When there is so much medical evil to be remedied in the world, may they keep on trying. Indeed, Apostoli himself tried his own procedure empirically for the first time.

The remaining part of the sentence is not clear. It may be the fault of the translator, *i. e.* "discrediting a certain agent." The word "agent" does not mean dosage, as the next paragraph is devoted to it. Does it?

There is on my part no intention of discrediting anything or anybody who has had anything to do with the operation to help it along. I honor Apostoli and all who have done this operation. There is a distinction between a man and his sayings. We all are workers together to lift off the opprobia medicorum too numerous to-day. Still, in the paper under notice, one is struck by noting that Dr. Apostoli gives no credit to any operator but himself. On the contrary, other operators are charged with defects and want of skill. Having done this, neither he nor his friends can complain if he is confronted with the claims of others.

"Secondly: Without dosage; that is to say, without any instrument in the form of a galvanometer." This does not mean the writer, as it states that I never used a galvanometer; whereas, I have used one. I have witnesses to prove it. In my opinion, based on the results, while dosage is recommended, it is not absolutely essential to success. Measuring a work is not doing it. A man does not build a wall by measuring it. Now, while there are cases of this operation where absolute cures have been realized by galvanism, and where no milliamperemeter nor voltameter have been used, they show that good results have been had without them. Indeed, the cases in which I have used the meters aforesaid were not cured, so there was not the advantage gained that one would judge from the indispensability dictum as to dosage. If the end of the operation is measurement, then measurement is absolutely necessary; while, if the end of the opera-

tion is cure, the advantage seems to be with those whom Dr. Apostoli decries, for I have yet to learn (I hope I am mistaken) that Apostoli has ever cured a uterine fibroid by electricity.

In my reports,* I have dictated to none, and I will not be dictated to by any one who has not had as good results as I have had.

Line 52. "Thirdly: In a dose insignificant"

*Reply.*—I have used five hundred milliamperes.

"Generally so small as to be useless."

If Apostoli could meet with some of the cured cases and make this statement to them, I fear his experience would repeat that of one physician who made a somewhat similar statement, in the presence of a cured case of mine, at a gynæcological meeting. She was so indignant she could hardly restrain herself. The next day she visited him at his office, and he retracted.

Line 54. "Fourthly: A method always extra-uterine, in no way directly acting upon the uterine cavity, and but slightly upon the neighboring parts of the vagina."

*Reply.*—The word "always" is fatal to this dictum. It embraces too much; it implies that Apostoli has seen all of our cases; but he never saw one. Indeed, if the statement was true, it does not prove that electricity should be always applied intra-uterine, for I have had cases where no uterus could be found, the growth being very large, hard as rock, packing the pelvis full and pushing the womb out of reach. What right has any one not present to say my electrodes did or did not penetrate intra-utero? And, as for acting on the vagina, there is not much significance in the criticism, for I can see no reason why the vagina should be acted on only as it is in the way of the electrodes.

But in many cases the punctures have been made purposely intra-uterine, and did act on the uterine cavity, because it came in the way of the electrodes, and the application was followed by intra-uterine discharge. It is our rule to act on the fibroid alone whether in intra- or extra-uterine, and such action I have found to cure and to justify my action. This was also the reason of the invention of my needles, which have never failed, save in a case of a calcareously degenerated fibroid. The rule is to penetrate the fibroids with needles in the easiest and shortest way possible, profoundly puncturing and conveying the whole current to the deepest part of the tumors.

Line 57. "Fifthly: By a method often dangerous, from galvano-puncture being made above the pubes and through the abdominal integument."

*Reply.*—First, this is a partial statement. The first case, in 1871, was almost exactly like Apostoli's method, per vaginam and abdomen. Sometimes both needles have been used through the vagina, sometimes one the same way and sometimes one by the rectum. As to danger, see statements before made as to deaths.

Much obliged for the word "often," as it is not such a universal term as "always," which has been used in conversation about this operation, and shows a want of consideration.

Line 60. "I originated a new and rational way of using electricity for this purpose. I have supplanted the old way (what way? mine or that of others?) by a method which is precise, by the introduction of the galvanometer of intensity."

*Reply.*—Galvanometers are voltameters and amperemeters. Did the gentleman invent these? If any one before him intercalated a galvanometer during the operation on a uterine fibroid, it makes void his statement. I did this in 1878 or 1879.

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* E. Cutter, M.D.: "Contributions to Gynæcology. First fasciculus. The galvanic treatment of uterine fibroids: full text of first fifty cases." Octavo; eighty pages; two cuts. Paper, 75 cents; cloth, $1.00. W. A. Kellogg, publisher; 9, West 29th St., New York.

"Energetic by an absolutely novel service of high intensities of current, which I have progressively used from fifty to two hundred and fifty milliamperes."

*Reply.*—I have used, as before stated, all along, five hundred milliamperes, according to my best judgment.

"Tolerable, in spite of the enormity of these doses, because of a clay electrode."

*Reply.*—Thanks to Apostoli. I think Martin's modification a better thing to use than clay, but this is opinion only.

"Better localized by a direct application of the active pole by way of the vagina to the uterus, either in its cavity or in the substance of the fibroid."

*Reply.*—Is this better localization than was used in 1871, of having the electrode buried profoundly deep in the very substance of the fibroid? If so, then language fails to express the meaning of things. And if, in 1883, it was original to better localize the galvano-puncture by putting one electrode through the neck of the womb, or through its substance (his method does not tell what to do when you cannot find the uterus), and the other clay electrode over the pubes (how is it when the fibroid makes the patient bigger than a woman at full term?) where is the originality of 1871, when the uterus was punctured through the vagina and a sponge electrode used over the abdomen?

Column 2, line 24. "Thoroughly under control by the exclusive choice of the unipolar method."

*Reply.*—This is not a good term to use. Unless one has two poles, there can be no current, any more than a boat can be moved forward with one oar.

But I will carry this no further. I am grateful to Dr. Apostoli for what he has done that has advanced the interests and knowledge of this subject. I distinguish between him and his sayings. When the latter are not sustained by history, history must have the preference.

Dr. Apostoli has dictated to his predecessors and discredited them, even his own countrymen. Would it not have been better to have given them credit for what they did, and not try to build upon their supposed ruins?

Fact is eternal. Opinion not based on fact is not wisdom.

### CONCLUSIONS.

1. When an untried operation is proposed, it is not wise for those whose opinions are sought as experts to say it cannot be done. This present Congress and the attention paid to this subject must be uninspiring to those who interdicted me in 1871.

2. It is wise to give all due credit for what they do. An old book says: "They measuring themselves by themselves are not wise."

3. In performing this operation use common sense, and not follow any one's method unless indicated by the particular case in question.

4. After this, any physician who says that uterine fibroids are hopelessly incurable is not sustained by the facts and evidence.

5. I recommend warmly the use of the Salisbury plans of diet to be used in connection with galvanism. I have known large fibroids to be cured in a few months by diet. I have known the same result by electricity; henceforth, I use one or both, as I am able.

### DISCUSSION.

Dr. Kellogg, of Battle Creek, thought that Dr. Smith's paper was an eminently practical one. He felt satisfied that electricity would before long occupy a very important position in uterine therapeutics. He was already using it very extensively, but intended to use it much more.

Dr. Bozeman, of New York, quite agreed with Dr. Smith that it was more rational to strengthen and develop a weak organ than to support it with mechanical appliances or to cut it away. He thought with Dr. Smith, that a perfect knowledge

of the anatomy and physiology of the pelvic organs was a first requisite for successful gynæcology.

Dr. A. LAPTHORN SMITH, of Montreal, replying for Dr. Apostoli, observed that the latter did not have Dr. Cutter in view when he related that until lately electricity had been used in an uncertain and, sometimes, hazardous manner. Prior to the Electrical Congress of Paris, when the definite measurement of electricity was fixed, there was no means of employing certain, definite doses; but, now that we have the means of measuring electricity accurately with the amperemeter, there was no longer any excuse for employing it haphazard, and every one can employ it rationally, the same as they would strychnine or atropine. Apostoli, he said, preferred to puncture the fibroid through the vagina rather than through the abdominal wall, for three reasons:—

1. Because these growths were most often situated in the posterior segment of the uterus, and were more accessible from the posterior vaginal cul-de-sac.

2. Because it was much less dangerous to puncture through the vagina, as the peritoneum could be avoided; and if an abscess resulted, it could with safety be drained into the vagina, which was kept antiseptic.

3. The negative monopolar galvano-puncture was much more efficacious than the bipolar puncture, the whole force of the current being concentrated at the negative electrode in the substance of the fibroid, large pieces of which frequently came away.

If the fibroid were situated in the anterior half of the uterus, Apostoli was content to apply the negative intra-uterine current, which required no anæsthetics, but was somewhat longer. If the tumor caused metrorrhagia, he used, on the contrary, the positive pole, which possessed the property of arresting it. He had thus been able to cure many fibroids without puncture. He was much struck, at Apostoli's clinic, with the thorough manner in which antisepsis was carried out. Every visitor had to scrub his finger nails with bichloride solutions and soap and water, and even the most trivial examination of a patient was never made without a thorough irrigation of the vagina with 1–5000 sublimate solution. This probably explained Apostoli's wonderful immunity from accidents of any kind.

Dr. F. W. MARTIN, of Chicago, said that the milliamperemeter merely indicated the strength of the current which was passing, not its density nor the resistance it was overcoming; it was, therefore, not so essential a factor in the appliances for treatment as Apostoli maintained. He criticised Apostoli's method of treating hemorrhage, on account of the enormous strength of current it required. He was able to accomplish the same end with the use of far less force, by applying sounds successively to different sections of the uterine mucous membrane, each sound being insulated except for a very limited extent, the exposed part being situated at a different distance from the extremity in each sound. He believed that a single cell battery like Cutter's was inefficient for the purposes for which it was constructed, and that it could by no means give rise to a currrent which would traverse a space of two inches through solid tissues, as asserted.

Dr. JAMES R. KING, of Clifton Springs, N. Y.—I beg leave to occupy a small portion of the valuable time of this Section of the Congress, to call attention to some special points in the papers read on the subject of Uterine Fibroma, and to make some additional observations on the same.

I was much interested in Dr. Nelson's instructive paper on the "Treatment of Uterine Myoma by Ergot." His experience and contributions are of special value to the profession.

In 1877 I began a series of observations on the use of ergot in fibroma of the uterus. In the succeeding five years I kept a careful record of sixty-nine cases treated by ergot, with favorable results. I will not weary you with statistics at this time. In the latter part of this period of my experience I began using faradism and galvanism in the treatment of fibroma, and obtained better results than I had with the ergot. In 1882 I abandoned the use of the faradic current and employed only the galvanic current in the treatment of uterine fibroma. About this time I became greatly interested, encouraged and instructed by the ability, genius and success of our distinguished friend, Prof. Apostoli. I was greatly pleased with the good results I obtained from using galvanism after his method. In 1884 I became deeply interested in his successful reports and encouraging assurances presented at the International Medical Congress held at Copenhagen.

In 1885 I went to Paris to see his work in the hospital, and was still more pleased with his method of treatment.

I pause here to say that just before discontinuing the use of the faradic current in the treatment of uterine fibroma, I began using ergot in combination, first, with the faradic and later with the galvanic current. While I am sure that not too much can be said in praise of Prof. Apostoli and his work—which I regard as the greatest advance that has been made in the last decade in the department of gynæcology—yet we must ever remember that these cases are found in the practice of every physician, while at the same time few have the courage to use a galvanic current of the great strength which Prof. Apostoli employs, and which seems so simple and successful in his hands. Ovariotomy in the hands of a skillful and practical surgeon is a very easy operation, but in the hands of one less skillful and experienced the same operation would be a failure. This same principle is true to a great extent in the treatment of fibroma by the strong galvanic current. In the skillful hands of Prof. Apostoli it is followed by no troublesome complications, but this is frequently not the case when used by less delicate operators. In my own experience I have several times had unfavorable complications. It is possible, however, for all operators in the field of gynæcology to use a milder galvanic current in combination with the internal use of ergot and obtain the most favorable results. I have used, as I said, ergot in sixty-nine cases of fibroma of the uterus, with considerable success.

I have since treated a series of fifty-one cases with galvanism without ergot, with much better success. In the last two years I have had thirty-two cases of fibroma, in which I have employed galvanism, following closely in the line marked out by Prof. Apostoli. I have at the same time combined with it the use of ergot, and the results have been much more satisfactory, in the rapid diminution of the tumor and in lessening the hemorrhage. The muscular contractions induced by the continued use of ergot seem to decidedly hasten the chemical action and absorption resulting from the use of the galvanic current. In my experience the combined use of galvanism and ergot seems to be far more rapid and effectual in accomplishing the work for which they are employed—the diminution or dispersion of the tumor and the prevention of hemorrhage—than when either are employed alone. My plan is to use a strong galvanic current every second, third or fourth day, according to indications, also Squibb's fluid extract of ergot three times a day until marked pains occur, resembling the pain of dysmenorrhœa. Then I gradually decrease the dose until the pain ceases.

Many interesting cases of recent date in which this plan of treatment has been employed might be given, but I will only refer to one.

CASE.—A single woman; age, 39. The tumor was about five inches in diameter.

The uterine canal five inches long. She suffered from menorrhagia and metrorrhagia, and was much weakened and exceedingly nervous, and was having convulsions of a nervous type every two or three weeks. She has been under my care two months. I have used the combined galvanic and ergot treatment; the tumor is reduced to one-third the original size. The menses are regular and normal, the convulsions have ceased, the nervousness has almost entirely disappeared, and she seems to be quite well.

I wish to refer briefly to the important paper read by Dr. Smith, of Toronto, on the treatment of displacement, etc., by the faradic current. This subject is one of great practical value to the specialist, but still more so to the general practitioner; first, because the manipulation is easy, secondly, because the most gratifying results are attainable.

Few physicians can shorten the round ligaments, for displacements, by operative procedure, as does Prof. Alexander, of Liverpool, but all can *shorten* them by the use of the faradic current. I have found it of great service, not only in prolapsus, but also in flexion. When we have a weak spine with lateral curvature we apply electricity to the weakened muscles and stimulate contraction, and thus develop muscular tissue. When a subinvoluted or hypertrophied uterus is bent in any direction, the muscles become weak, and atrophy necessarily follows. The faradic current corrects this condition more rapidly than any other therapeutic agent, and sooner enables the replaced, straightened and involuted uterus to retain its normal position. At the same time we have the tonic effect upon the muscles of the vagina and uterine ligaments.

Dr. Gilman Kimball, of Lowell, Mass.—I do not wish to detract in the least from the reputation attained by Dr. Cutter in his application of electrolysis in the treatment of uterine fibroids, but it is proper, and only just to myself, to make a brief statement in regard to the circumstances which led, so far as I understand the matter, to the adoption of this special mode of treatment in this form of disease.

A patient had come from a distant part of Massachusetts to consult me in reference to a tumor in the abdomen, of several years' standing, which her physician had declared to be ovarian, and which could be cured only by removal by a surgical operation. Upon examination I saw at once that the tumor in question was not ovarian, but a clear case of uterine fibroid. Upon telling the patient that an operation for its removal was too dangerous to be attempted, and therefore altogether unjustifiable, she was not only greatly disappointed, but exceedingly distressed at the thought that her case was such as to admit of no remedy. I endeavored to console her by stating that such cases were, as a rule, not at all of a dangerous character, and that persons similarly afflicted seldom died on account of their presence. Seeing that she was not to be comforted by any assurance of this kind, I then told her that I had been thinking for some time of experimenting upon this form of tumor by the application of electricity or galvanism, and if she felt willing to be the first to submit to this form of treatment and come to the Hospital in Lowell, then under my charge, we could soon ascertain whether or not this plan of dealing with the case was likely to be of any benefit. She readily agreed to accept my suggestion, and in a few days later she presented herself at the hospital, and the day following was operated on, Dr. Cutter being present and assisting. This, so far as I know, is the first case on record of uterine fibroid treated by electrolysis. It deserves to be stated that the patient, at the time she came to consult me, was suffering greatly from a dropsical condition—ascites, hydrothorax and anasarca, and to such a degree that she had been unable to lie down for the past six weeks, and was, therefore, obliged to pass her nights by sitting upright in a chair. The morning following the first operation I found my patient in excellent condition—had slept comfortably all night—and the dropsy almost entirely

gone. She explained this change by saying that she had passed during the night, *seemingly, gallons* of urine. So much for the *immediate* effect of electrolysis in this case; I made four or five operations in the course of two weeks, but my leaving for Europe at the beginning of the third week relieved me from further connection with the case, the patient at the same time returning to her home. I heard nothing further from the case till my return to Lowell, when I learned that she had died but a short time before, but the circumstances connected with her death I never ascertained.

My second case occurred in the course of a few days after the first. The patient had been bed-ridden for many months, on account of a fibroid involving the uterus, as large as a man's head. I made one operation in this case, and subsequently two more were performed by Dr. Cutter. The effect of these three operations was to bring about a complete disappearance of the tumor in the course of twelve months.

I might give other cases equally marked, illustrating the effect of electrolysis in bringing about a similar result, but to present them in detail would require too much time. It would be doing injustice to Dr. Cutter if I were to omit stating that I am under great obligations to him for many important and useful suggestions bearing upon this subject, and particularly for his having supplied me with the various appliances which I have employed in most of my operations, and to him, probably more than to any one else in this country, is now due the present increasing belief in the great value of electrolysis in the treatment of uterine fibroids.

Dr. Apostoli spoke in defence of his system. He wished to give Dr. Cutter all credit for his investigations, but now that we have the means of measuring electricity, a measurement made definite by the Electrical Congress of Paris, there is no excuse for using it haphazard, and every one should use it cautiously.

Dr. Garratt, Boston.—I wish to say that my relation to Dr. Cutter's operations was only to decide whether he actually passed any current through the tumor by means of the apparatus and method he employed. This was decided by me to have been done, as proved by experiment on the living rabbit, and also by a German galvanometer, but I could not measure it, as I knew of no reliable instrument at that time, nor could I tell how much electrolysis passed. Not to be mistaken, I attended one of his operations in connection with several physicians, taking along my galvanometer, which I attached to one of the conductors, so that the current could be shown while operating; that is, to show whether any current passed. All the gentlemen present watched the estatic needle as the contact of battery was broken and made again, and all were satisfied that a current did pass. The source of difference of opinion in regard to a current passing from one large and powerful cell, is owing to the large electrodes, both being in the tissues near the hip, often, which offer much less resistance than is generally known. As to the laws of electricity as now laid down, they are no more to be questioned than the laws of chemistry or astronomy, by any scientific men.

Dr. Ephraim Cutter, in closing the discussion, said, as to the question of priority with Dr. Kimball, I wish to have no question with one whom I venerate, but will simply refer to Dr. W. Symington Brown's article, published February 8th, 1873, in the *Philadelphia Medical and Surgical Reporter*, and republished in the February number of the *American Journal of Obstetrics*, of 1887: "Still, it was concluded to make trial of electricity, which was done twice, under Dr. Cutter's supervision. The first trial was made August 21st; a second attempt was made eight days later; Dr. Gilman Kimball, of Lowell, was present at the second trial and inserted the needles."

Dr. A. C. Garratt has answered Dr. Martin's wager of one thousand dollars, that my current would not go through two inches of tissue, by his experiments with a living rabbit; but I should like to have my son, Dr. John A. Cutter, testify as to an operation in New York.

Dr. JOHN A. CUTTER said, "I saw a small Brazilian woman with an immense abdominal fibroid, giving her the appearance of a woman at full term, anæsthetized; I saw the Cutter battery put in running order, measured and found to have twenty-six and a half amperes of direct current. I saw two of the Cutter electrodes pushed deeply through the abdominal walls; I saw the battery connected with these electrodes, and the current allowed to pass for five and a half minutes; I saw an amperemeter intercalated, and it registered that one-half an ampere, or five hundred milliamperes of current were traversing the fibroid. The current was allowed to go through the tumor for three minutes longer; the battery was discontinued, and on measuring it showed to have twenty-six amperes of direct current, showing a loss of less than one-fiftieth of its strength during the operation."

Dr. E. CUTTER then asked the Chairman if he would have Dr. Apostoli come forward and state whether he had had any entire cures or not. Dr. Apostoli said that his cases were cured symptomatically; the tumor did not go away, but the patients felt so well that there was no inconvenience. Dr. Cutter then continued, that this was the second time in sixteen years he had ever replied to any criticisms, and he had only done so at this time because he thought that the Congress ought to know of the facts. He wanted all to join in this work; wished all that were in earnest God speed; his method or any others were of no importance, but we must "cure the women! cure the women!"

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Mr. W. DUNNETT SPANTON, F. R. C. S. E., of Hanley, England, presented a paper

## SOME POINTS IN CONNECTION WITH CYSTITIS IN WOMEN.

### QUELQUES POINTS EN CONNEXITÉ AVEC LA CYSTITE CHEZ LES FEMMES.

### EINIGE PUNKTE IM ZUSAMMENHANGE MIT DER KYSTITIS BEI FRAUEN.

I should have hesitated in bringing to your notice such a well-known affection as cystitis, if I desired merely to describe that condition. I find, however, some justification for referring to what many may consider a worn out and unsatisfactory theme, in the confused accounts which are to be found in most writings on the subject.

First, I desire to distinguish between irritability of the bladder, which is usually functional only, and inflammation, which may be a sequence of irritability, but is more often independent of it.

We often find intense irritability, as in some of the conditions I shall have to speak of, while, on the other hand, we meet with severe and old-standing inflammation, in which no appreciable irritability exists. Irritability may be looked upon rather as a symptom than a disease, and in this paper I propose to direct attention to the necessity for discovering the cause before we attempt to deal with the symptoms. That point made clear, it will become less difficult to attain success in our treatment.

It is, of course, unnecessary to say one word as to the ordinary symptoms of irritable

bladder and of cystitis; they are, unhappily, so well known that, according to one authority,* every one suffers from the former condition, more or less.

The causes are so numerous that it would be difficult, if not impossible, to enumerate them all. They may be either: first, constitutional; or second, local.

### IRRITABLE BLADDER.

1. Of the constitutional states producing this affection, the chief are general irritability of the system; certain diseases of the brain and spinal cord; gout and chronic rheumatism; certain states of the kidneys leading to lithuria, oxaluria, and other irritating products in the urine, and among these I would mention certain kinds of drinking water, and such substances as coffee, taken habitually by some persons; diabetes and albuminuria; neuralgia of the bladder, and the unchecked force of habit, particularly in children.

2. *Local Causes.*—Of those within the bladder itself are growths, small calculi and other foreign bodies, ulceration of the mucous membrane, a contracted or over-distended state of the viscus.

From without, in the urethra, we may have an abnormally narrow canal, especially at the meatus, either congenital or acquired; urethritis; a thickened, strumous condition of the mucous membrane, like that of conjunctivitis in children; eversion of the bladder or urethra; growths, especially vascular tumors; catheterism and sexual abuse.

In the neighboring organs there may be alterations in the size, structure and position of the uterus, Fallopian tubes or ovaries; disease of the os or cervix uteri; certain conditions of the uterus, such as dysmenorrhœa and early pregnancy, being in these cases probably purely sympathetic; distention or disease of the rectum; ascarides; hæmorrhoids; anal fissure and fistula; tumors in the vagina; injuries, such as from prolonged or instrumental labor; inflammatory state of the external genital organs, more particularly in children; and, as was pointed out by Dr. Graily Hewitt, not as a cause of irritable bladder, but as one of involuntary micturition—bands of cicatrices in the vagina. In a case I have to relate, this was a clear cause of extreme irritability.

Mrs. H., aged fifty-eight, an active woman in good general health, had been suffering for a long period from increasing irritability of the bladder, with very frequent micturition. A careful examination of the urine and bladder revealed no cause for this; but on examining the uterus I found a tight fibrous band stretching from the anterior part of the uterus to the vaginal wall, over the bladder. The uterus and surroundings were otherwise normal. Constitutional remedies, rest, etc., gave no relief, so I freed the bladder by dividing the vaginal band, and from that time all the irritability of the bladder disappeared. In the case Dr. Graily Hewitt speaks of, in which division of cicatrices cured incontinence, the urethra was probably kept patent by the pulling upon it of the band; whereas, in the case of Mrs. H. the proper distention of the bladder was interfered with. That is, I imagine, the explanation of why the remedy was so complete.

*Cystitis*, either acute or chronic, may arise from most of the causes which I have enumerated under irritable bladder, when prolonged beyond the causation of that state.

The more common causes are inflammatory discharges conveyed from the kidneys, the urethra or some fistulous opening; calculi; gravel; sacculated bladder, allowing urine to remain too long, though this is, I think, uncommon in women; foreign bodies; wounds; dirty catheterism; growths within the bladder or in the urethra; exposure to cold; prolonged or instrumental labors; irritating medicines, such as cantharides; over-distention, as in a case which was under my care (recorded in *Lancet*, 1882, vol. II, p. 660). In this instance, which occurred in a woman thirty years of age, complete

* Dr. Matthews Duncan.

retroversion of the uterus with four months' pregnancy caused retention for fourteen days, and the case was sent as one of ovarian tumor. 160 ozs. of urine were withdrawn, and the next day 70 ozs., with blood clots and mucus; symptoms of acute cystitis followed, and death occurred on the fourth day. Among other causes are altered conditions of the uterus, pregnancy, retroflexion, anteflexion, prolapse, tumors of uterus and ovaries or Fallopian tubes. In some of these cases the bladder is dragged up, in others there may be cystocele, or it may be squeezed against the pubis, or, as in a case which I will presently relate, be held in such a manner, by inflammatory adhesions in the pelvis, as to prevent its proper expansion. Dr. Matthews Duncan has stated (*Medical Times and Gaz.*, 1878) that he is "strongly of opinion that no change of position, no distortion, no pressure of any ordinary kind, causes irritability of the bladder." "You will see the bladder," he says "without a trace of irritability, yet having every possible shape and every kind of displacement, and I see no sufficient reason for referring the irritability to its change of shape, or pressure or displacement." I think there are few who will agree with this statement; for if it applies to irritability, it must apply with still greater force to the causation of cystitis. It is a dangerous doctrine to lay down; and to argue that irritability or inflammation may exist without any of the conditions named, is no sufficient reason why either of them may not arise from those conditions, as in the first case I have related.

Perhaps one of the most frequent causes of urethritis leading to cystitis, next to specific and renal discharges, is the so-called vascular tumor of the urethra. The frequency with which this is overlooked by general practitioners deserves to be noted, and, although the affection was described by Ferrins, so long ago as 1575, attention was not specially directed to it until described by Sir C. Clarke, in 1815. It was considered "only hypertrophied mucous membrane, which might readily be cut off," by Meigs; but its extreme sensibility in some cases led Sir James Simpson to state that they were distinct growths, containing nerve filaments. The suffering caused by these obscure growths is often out of all proportion to their intrinsic importance, and I will briefly record some cases which may be considered typical of the errors to which they sometimes give rise.

Mrs. C., a married lady, sought advice for bladder irritability, frequent micturition, with pain, referred chiefly to left side and back, and occasional dysuria She had been under treatment for a period of two or three years, and I was informed that she was said to be suffering from renal disease. She had never been examined. The urine was cloudy, with mucus and phosphates; there was no albumen nor other indication of kidney mischief. I insisted on an examination of the bladder, and found, as might have been anticipated, a vascular growth at the entrance of the urethra. This was removed by scissors and actual cautery; all the bladder trouble quickly disappeared and has never returned.

Another similar instance of a married lady was referred to me by a medical man under whose care she had been for some years, as suffering from Bright's disease. His supposition was based upon the fact that there was a small amount of albumen in the urine, and she suffered greatly from irritability of the bladder, with all the usual concomitants.

Finding her general health excellent, I sought for a local cause of her troubles. Upon examination I found a small but very indurated caruncle within the urethra, which caused the pus which made the albumen, which led to the pain, and which was, in fact, the *fons et origo* of her long-standing troubles and her medical attendant's blind anxiety concerning her case. Removal of the growth, followed by an application of potassa fusa, completely cured her, and the lady has kept perfectly right ever since.

I may mention another case, interesting in connection with this affection, that of a lady, forty-two years of age, who consulted me in consequence of more or less constant hemorrhage, which had been going on for two years, and which she and her friends

ascribed to something in connection with "change of life." Its long continuance caused her alarm at last, by the anæmic effect on her general health. She had no pain, no vesical or urethral irritation, only hemorrhage. There was nothing more the matter than a highly vascular urethral growth, bleeding on the slightest touch. With its excision all her troubles ceased.

Cases such as these could easily be multiplied, and are, no doubt, familiar to most of you; but they are too apt to be overlooked when the gravity of the symptoms seems to indicate a more remote or more important source. The best treatment I have found for these growths is to excise first with scissors or knife, and then apply actual cautery (galvanic or thermo-cautery) or caustic potash. Usually the application of acid alone, of whatever kind (and I think I have tried all kinds), has been in my hands unsatisfactory, unless for very minute growths. In very large ones the galvanic écraseur is the best remedy, by far. In one case a very good result ensued after excising the growth and stitching the cut surfaces together.

To return to another cause of cystitis to which but little reference has been made, so far as I know, that of morbid conditions of the ovaries and Fallopian tubes, where no large tumor is in question, but where adhesions of an inflammatory character exist: Such instances must be familiar to those who do much abdominal surgery; but whether the bladder trouble is caused by the fixation of the organ by the dense adhesions around the uterine appendages, and is thus prevented from proper natural expansion, or whether it arises from contiguity of inflammatory action, I will not venture to express an opinion. I only desire to call attention to what I conceive to be the fact, that such cases are more frequent than many would suppose, and that when this is the cause, a cure can only be hoped for by its removal. As an illustration, I will relate an interesting case which may serve as a type of those to which I allude.

### CASE OF OVARIAN AND TUBAL DISEASE AND INTRACTABLE CYSTITIS.

I. W., single, aged seventeen, admitted under my care in the North Staffordshire Infirmary, August 6th, 1883. Never very strong, she had an attack of pneumonia and pleurisy two years before, and about six months afterward she began to suffer from pain in the region of the bladder and ovaries. The catamenia appeared only twice, and had not reappeared for two years. Frequency of micturition, turbid urine and constant pain were the symptoms for which she was admitted, having continued for nearly twelve months, in spite of treatment and rest in bed for four months. On admission, a tall, pale, emaciated girl, bright and intelligent, quite unable to walk or even to stand without great pain, which was referred to the pubic and ovarian regions, especially the left. Frequent, almost incessant, micturition, the urine specific gravity 1020, alkaline, purulent and slightly sanguineous.

*Examination under Chloroform.*—The uterus was found flexed, the fundus displaced toward the left. The left ovary was enlarged and felt fixed. The right ovary could be felt also, indurated, immovable and tender to touch. Nothing abnormal could be felt in the bladder. Her life was perfectly wretched; sleep was almost impossible. Remedies of various kinds were employed, irrigation of the bladder, pessaries to endeavor to rectify the position of the uterus, both extra- and intra-uterine, and drugs of all kinds, without the slightest improvement. Leeches also were applied to the ovarian regions, which gave temporary relief only. After four months' persistent perseverance in this way, I thought it was quite justifiable to propose the removal of the ovaries, which I could not help believing were at the root of her troubles. To this the patient and her friends at once assented, as they would have done to any other proposal at that time, such a life of misery was it for the unfortunate sufferer.

On December 5th the operation was performed. I removed the right ovary and Fallopian tube, which was nodular, and contained, along with some pus, a hard, irregu-

lar mass of tubercle (confirmed by a microscopic examination). Both were firmly adherent to each other and to the broad ligament, pulling upon the uterus and also dragging the bladder. The left ovary was so densely bound down in a mass of adhesions, that I was unable to remove either it or the tube of that side. The abdominal wound healed by first intention, and she lost the "old pain" almost immediately. For three or four days urine escaped involuntarily, although a catheter was used. So a soft rubber one was retained in the bladder for a few days. The urine rapidly changed to a healthy character, and she soon acquired complete control over the bladder. The house surgeon's record of the case goes on to say, "after this there was no symptom worthy of note, and she made a good recovery. . . . . She was discharged on December 24th, quite relieved from her former suffering, and having recovered from the operation completely. She came to the nurses' dance on January 1st (twenty-six days after operation) and said she felt quite well, and danced two or three times during the evening, although advised not to do so."

This young woman is now, nearly four years after, well and active.

Now, I would ask, in this case, if the condition I have described was not the cause of the visceral trouble, what was? and why should it all have ceased when what was the only apparent cause was removed. No other explanation seems possible. It would seem as if the indurated tube had undergone so much contraction, along with the broad ligament adjacent, as to pull upon the uterus on the one hand and on the bladder on the other, so that the two organs were pulling against each other, and this seems the most plausible reason why their release by removal of the parts led to such speedy relief, not only to the bladder but to the uterine difficulty.

One other case I must mention, to illustrate another cause to which I referred in a dual capacity—dysmenorrhœa leading to over-distention of the bladder, with great irritability, and at times, incontinence.

A single lady, aged twenty-six, was sent to me with symptoms of long-standing, severe dysmenorrhœa and bladder irritability. She had been under various kinds of treatment. She suffered greatly at the menstrual periods from uterine pain, scanty flow, and almost incessant desire to micturate. Over the left side of the abdomen was a rounded, elastic swelling, reaching from the ilium nearly to the linea alba. The pubic region was free and clear on percussion. I found stenosis of the os uteri, with very small uterine development; and the tumor consisted of a very distended bladder, which was tilted completely over to the left side. The urine was normal. I divided the cervix uteri and dilated it, had a catheter used afterward at regular, frequent intervals, and in a fortnight the symptoms had disappeared; she went home into the country quite well, and has never been troubled since.

Some authors might put this case down as neurotic or emotional; but my own feeling is that where you have a physical cause, and the removal of that physical condition is followed by the cure of the affection from which the patient suffers, it is altogether superfluous to seek to assign some remote nervous state as the root of all the mischief. There are others who have written on this subject who advocate that in all cases of troublesome cystitis, either dilatation of the urethra or kolpocystotomy ought invariably to be performed. I have seen excellent results from kolpocystotomy, as advocated so well by many American surgeons; but it is a measure which ought only to be had recourse to when other remedies have failed.

The main object of this paper has been to urge that an empirical treatment of the affections of the bladder which I have described is unjust to the patient, and will prove unsatisfactory to the surgeon; that it is most necessary to trace out the cause in every instance; neither assuming from a medical point of view that it must be constitutional on the one hand; nor from a surgical standpoint insisting that the origin must of neces-

sity be local; but, after a careful examination, which ought to be insisted on in every case, to treat each case on its merits, not merely on general principles.

DISCUSSION.

Dr. BOZEMAN, of New York, in discussing this paper, took up the subject of cicatricial contractions, flexions of the uterus and diseases of the urethra.

The cicatricial bands produce sacculation of urethra. Bands should be cut and parts kept extended. In flexions replace uterus by graduated pressure. In prolapsus of the urethral mucous membrane clip it off. Would treat urethra as suggested by Dr. Spanton in his paper.

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# EARLY HISTORY OF THE REVIVAL OF OVARIOTOMY IN THE WEST.

## HISTOIRE ANCIENNE DE LA RESTAURATION DE L'OVARIOTOMIE DANS L'OUEST.

## FRÜHE GESCHICHTE DER WIEDERBELEBUNG DER OVARIOTOMIE IM WESTEN.

BY ALEXANDER DUNLAP, M. D.,
Springfield, Ohio.

GENTLEMEN OF THE SECTION IN GYNÆCOLOGY:—I stand before you to-day an old man, on borrowed time, surrounded by the wonderful light that 1887 is shedding upon the science of our profession. My object, however, is to introduce to you a young man, a little over twenty-five years of age, standing amidst the darkness and mysteries that surrounded our profession forty-four years ago.

Early in the year 1843, with a very limited knowledge of medicine or surgery, I first came in contact with what was to me a strange form of disease. After watching and studying it for some time I became convinced that it was ovarian dropsy. I was led to this conclusion by the fact that no description found in any of the books in my possession would apply to it. In an old book, without any description of the disease, I found the statement that Ovarian Dropsy, or Tumor, was an incurable disease; that it had been removed by Dr. McDowell, of Kentucky, but that the operation had been tried and condemned by the profession as an unjustifiable operation, and he had abandoned it.

At that time my library was as limited as my knowledge of my profession. I had been forced into the study of medicine by circumstances over which I had no control. Being in poor health, my aim was chiefly self-support during the few years I expected to live. I had no ambition to attempt anything beyond making an honest living.

At once, after securing my diploma, I entered into partnership with an older brother, who had already gained some reputation in obstetrical practice. The history of my first case of Ovariotomy, referred to above, was this:—

Mrs. R———, aged 28, the mother of one child, had gone through pregnancy, confinement and nursing without any trouble, under the care of my brother. She had always enjoyed good health. In about a year after her confinement menstruation reappeared, and for a few months was regular and healthy; then it stopped, and she supposed she was pregnant. But in a little over two months menstruation returned profusely. Fearing miscarriage, my brother was sent for, and, with the administration of astringents and rest, the discharge soon ceased. No physical examination was made, for such examinations were not tolerated in those days, as they are at the present time.

She continued to enlarge a little more rapidly than she had done in her former pregnancy, which she accounted for upon the theory that she was carrying twins. Occasionally she would have a slight hemorrhage, which was easily controlled by rest and astringents. When the nine months at the end of which she expected to be confined had expired, she was taken, as she supposed, with severe pains of labor. My brother was sent for, and found her with regular recurring hard labor pains.

Upon making a vaginal examination he found the uterus entirely empty, and of a normal, unimpregnated size, but pushed a little down in position. The abdomen was enormously distended. He immediately gave her an opiate, and told her she was not impregnated. The pains soon left her and did not return.

My brother came home and told me of his strange experience ; said he did not know what was the matter with the woman, and requested me to visit her, which I did, but with as little satisfaction as my brother had had, except that I found that some portions of the abdominal walls were in a fluctuating condition, while other portions were solid and hard.

After several visits we concluded to tap her. Introducing an ordinary trocar, I drew off over two gallons of a dark, ropy fluid, to the great relief of the patient, leaving a large, nodular mass in the abdomen. We had hoped that the tapping would give us some light on her condition, and had told her so ; but here was "confusion worse confounded ;" two gallons of fluid, unlike any ordinary ascitic fluid, drawn off, with one side of the walls of the abdomen collapsed, while the other side remained distended by this large, nodular mass, held firmly in its place like a separate growth !

Although we had received no light on the case, we were satisfied that we had done the right thing, from the fact that the patient had been relieved from great suffering. We could not see that any harm had been done. At this stage the case was put entirely into my hands. I began to find a new and keen pleasure in the study of difficult cases. I had been, in several cases, sorely disappointed in the results when treating various diseases according to the then prevalent methods. Certain strange occurrences previous to this time, which seemed to be controlling my life, prepared me to enter with zeal upon the study of this, to me, new and strange case.

I read all that my limited library contained on abdominal tumors and growths. I consulted several physicians, but none of them had seen anything like this case. I returned again and again to the patient to watch and study the symptoms of her disease. I saw that she was rapidly refilling, and that the nodular mass was as rapidly disappearing, and losing its individuality in the rounded-up mass as the fluid reaccumulated and distended the abdomen. After tapping her again and watching the process of refilling with the same results as before, I came to the conclusion that it must be ovarian tumor or dropsy (as both terms were used), since it fitted no description of any disease that I had ever heard or read of. There was certainly some kind of dropsy here. I then gave her a name for her disease, which seemed, for a time, to satisfy her. But as the intervals between the frequent tappings were growing shorter, the patient grew rapidly weaker. She began to inquire into the nature of the disease. She was a very intelligent woman, and soon discovered from our conversations that I was about as ignorant of the disease as she was. At last she exclaimed : "Doctor, I am dying by inches ; is there nothing that can be done to stop this terrible disease ?" I told her there was nothing. I happened to say, during further conversation, that Dr. McDowell, of Kentucky, had cut one out. Immediately she said that she would have this cut out. I told her she must not think of such an operation, as Dr. McDowell had abandoned it, and the medical profession condemned it as an unjustifiable operation.

After this, at each visit our conversation was chiefly on the question of the operation ; she urging it, I dissuading her from it. Her friends at first agreed with me ; but upon a certain visit during the first week of September she received me with a bright

and cheerful look, stating that her friends had consented to the operation, and that it must be performed. She said I must not leave the house until I would decide whether or not I would undertake it; that her time was growing short, and that if I would not do it, she must find some one who would. I again told her that she must stop thinking about it, as she could get no doctor to do it. She replied, with intense earnestness, that if she could not get a doctor she would "get a common butcher to cut her open," as she was "determined to see that tumor before she died." Then, more calmly, but with determination, she said: "Proceed with the operation; do the best you can to remove it, but if you fail you will know that I take the whole responsibility of my death in case the attempt proves fatal."

I knew that she was neither deranged nor talking bravado. Under this appeal, scarcely knowing what I was saying, I promised to make the attempt. As I had come to tap her, I proposed to do so once more, and that at the most favorable moment after that I would perform the operation. To this she assented.

I started home, after tapping her, with a strange and oppressive feeling. I was about to enter deep waters whose currents, rocks and quicksands I knew nothing about, not knowing that there was even a shore beyond upon which I could land. I began to think aloud, and said to myself: "Well, young man, you have promised to operate upon that woman." "Yes." "Do you know anything about the operation?" "No." "Would you know the tumor if you were to see it?" "Do you know its position in the abdomen and the changed positions of the other organs in the cavity by its growth?" "No." "Do you know anything about its adhesions and attachments?" "No." "Do you know anything about the disease?" "Nothing; except that it is something growing in the abdomen that will smother the patient to death if let alone." "Well, then, if you attempt the operation with such a limited amount of knowledge, will it not appear like willful murder?" "I must confess it looks a little that way." I knew no way of obtaining a greater knowledge of the case. I was exceedingly worried, and would gladly have been released from my promise, but I knew she would not consent to it.

Seeing that worrying did not help matters, it occurred to me to turn to my knowledge of anatomy in search of light upon the case. It was said that the operation had been safely performed before, and with even my slight experience in surgery I was confident that if I had seen it done, or had a description of how it had been done, I could do it. But I was as one in the dark, with none to bring me a light. I was alone, with no one to advise me. I turned, as if by inspiration, to test my knowledge of anatomy. I questioned myself closely on all the different organs contained in the abdominal cavity and their relative positions. The liver, stomach, bowels, kidneys, omentum, uterus, and each organ contained in this cavity, whether I would know them when I would see them. My answer was, Yes. Do you know their positions and how they are held there? Yes. You know all that ought to be there? Yes. Well, then, to do this operation, you will have to remove all that ought not to be there. Can you do that? Yes. If another man has done that I ought to be able to do it.

I now returned home, and by careful study in a few days had the abdominal cavity and its contents as plain to my mind as if they were laid open to my vision, and felt ready and confident of my ability to do the operation.

I set September 17th, 1843, for the operation, and sent word to a number of physicians to be present and assist; but with one exception they declined, saying they could see enough people die without going to see one killed. The single exception was one who had been introduced to me as an army surgeon, who was not then practicing medicine or surgery, and who was addicted to drinking. I was thus left to perform the operation with the assistance of my brother, the army surgeon, and four students. I had no chloroform nor other anæsthetic. I gave her a small teaspoonful of laudanum and a

tablespoonful of whisky, and laid her on a table which I prepared for the occasion. No appliances were used to restrain her in any way, and with the slight anæsthetic described above she lay quietly upon the table without moving a muscle, watching the operation.

After carefully cutting down through the walls of the abdomen in a median line, I came to the peritoneum; carefully cutting into it, I found it adhered to something; but by extending the incision a little downward, I came to a place where it was free. Introducing the probe directory I enlarged the opening in the peritoneum, which discovered to me a something that was not bowels, nor stomach, nor kidneys, nor uterus, nor any other organ which should be found in the abdominal cavity; and therefore must be the abnormal tissue which I was looking for. The case now began to be clear to me, and in passing my finger in the adhesions were readily broken up, and I extended the incision through the abdomen in a median line until it reached half way from the umbilicus to the ensiform cartilage. Now by passing my hand gently and carefully into the opening thus made, the adhesions of the tumor on either side of the abdomen were easily detached. In doing this, however, I burst the large sac that I had been tapping, which flooded the whole cavity and the bed with its contents, and reduced the tumor very much in size. This left the large nodular mass lying in its bed on one side of the abdomen, the adhesions over it having been broken up. I supposed that it could now be readily lifted from its position, and this I attempted to do. But in doing so the patient for the first time made complaint that I was pulling something too hard. I immediately desisted from the effort, and passing my hand gently in around the tumor I found the difficulty in the attachment of the upper portion of the tumor to the greater curvature of the stomach. I very easily detached it, and finding no other adhesions, lifted the mass from its position in the cavity of the abdomen, and then for the first time discovered the long, slender pedicle formed by the broad ligament from which it had grown. I almost shouted "Glory!" for I now knew that I had the hemorrhage under control. In my ignorance of the manner of the growth of these tumors, I had supposed that in the enlargement of the ovary they might push in between the folds of the peritoneum, separating them until they reached the wall of the pelvis, and being checked in that direction would then push the peritoneum up before it into the abdomen.

There had been considerable hemorrhage from the breaking down of the adhesions, but that did not trouble me; it was my anxiety to get control of the large arteries which were nourishing this abnormal growth, and at that time I supposed these arteries to be much larger than they really were.

I now secured the pedicle with a double ligature passed through the centre and tied on each side, cut the pedicle and the ligature short, and dropped them into the cavity of the abdomen.

Now, the great danger that I had always apprehended, from what few surgical operations I had performed, was that of leaving blood clots in the wound, lest by their death and decomposition they should produce inflammation; and in this case I considered the danger so great as to be almost necessarily fatal. The blood clots, therefore, must at all hazards be removed. Quite a number of them had been formed by the blood oozing from the broken adhesions and had fallen down into the abdominal cavity among the folds of the intestines. Some were found even down in the recto-vaginal space in the pelvic cavity. These, by carefully sponging and turning over the folds of the intestines and lifting them out of the pelvic cavity, were removed. In doing this the sponging had also removed and thoroughly cleansed the abdominal cavity from all the fluids that it contained, leaving it as nearly dry as it was possible to make it. The removal of this fluid I did not at that time consider of any importance in the operation.

It was the blood clots, which I looked upon as almost necessarily fatal if left there,

that I was after. The abdomen, after being thus thoroughly cleansed, was closed by interrupted sutures and adhesive straps. Over this were placed a pad and bandages. The patient was placed in bed, showing but little shock, notwithstanding she had watched with apparent interest the whole of the operation.

With a fair secretion of the kidneys the case proceeded very satisfactorily for three or four days, when the bowels began to be troublesome from too frequent watery discharges. This continued for a week or more before I could get them under control. The wound, as far as I could judge, was doing well. The sutures I did not remove until the seventh day, and I found them slightly ulcerated. The wound throughout its length (with this exception) was apparently healed. When I got the bowels under control she started out with a fair prospect of recovery. There had been no peritoneal inflammation, and I now considered the case almost free from danger. But in two or three days the discharge of urine became excessive, when she rapidly ran down and died, twenty days after the operation, apparently from exhaustion produced by the enormous secretions of the kidneys, which now in a vicarious way took the place of the removed sac. The system, having become accustomed to an abnormal discharge of fluid, sought to use the kidneys for the same purpose when the sac was removed.

This was the first operation of the kind performed in Ohio, and the first in the West after the abandonment of it by McDowell.

The knowledge gained by this operation formed the basis for a correct diagnosis of the disease. Having closely watched the case from beginning to end, carefully noting every symptom, whether I understood it or not, and having made myself perfectly familiar with the viscera contained in the abdominal cavity, I was prepared to perform the operation. While performing the operation, and in watching it closely and the symptoms in the progress of the after-treatment, such a flood of light fell upon the nature, diagnosis and treatment of the disease, that was almost bewildering. It was not light reflected from the mind of some great professor, but light from the great Teacher, whether you call Him God or Nature, who never misleads, shining forth from His own great work, the human organism, "fearfully and wonderfully made."

A man may travel and see many countries, visit great schools and hospitals, and converse with great men, whether in Europe or America, but without light from the primary source of all truth he cannot reach the highest success. These all may be useful media and instrumentalities, but the other is food and inspiration to the mind, strengthening and guiding every faculty.

With my knowledge of anatomy I learned, by means of this case, the effect of the growth of the tumor upon the natural organs, and especially the displacement of the bowels which took place as a result of the tumor's growth. I found that there was but one place in the abdominal cavity in which this tumor could be developed; rising from the pelvic cavity, the growth of the tumor must necessarily push the bowels before it upward and backward into the lumbar regions, and as it still further ascends it must carry a portion of the bowels and the stomach up under the ribs—the tumor itself lying in contact with the anterior walls of the abdomen. This made plain to me certain symptoms discovered by palpation which, before the operation, I did not understand. I was now prepared to correctly diagnose the disease in the future, and I felt an increased confidence in my ability to perform the operation successfully. It was clear to my mind that Mrs. R—— did not die from the effects of the operation, nor from inflammation following it, but as a result of the frequent tappings which preceded the operation, and which had accustomed the system to an abnormally large discharge of fluid through the sac, so that when the sac was suddenly removed, this unusual discharge sought an outlet through the kidneys, which the patient, in her weakened condition, was unable to bear.

These conclusions were clearly impressed upon my mind at the time, and convinced

me that the operation was a justifiable one, but should have been performed at an earlier stage of the disease—*i. e.*, in this case before those tappings were performed.

I was now thoroughly prepared to defend the operation against the adverse criticism of the medical world, which at that time condemned it as unjustifiable.

With a great deal of labor and care I prepared a report of the case for a Cincinnati medical journal, the editor of which was my old Professor of Materia Medica in the Cincinnati Medical College—Prof. John P. Harrison.

The editor returned the manuscript, with a note explaining that his reason for not publishing it was that it would encourage an unjustifiable and murderous operation, which had already been tried and condemned by the profession, both in this country and in Europe. This, however, did not change my opinion of the operation. Unfortunately, perhaps under some resentment at the editorial treatment it had received, I destroyed the manuscript of the report, determining to perform the operation as I might have opportunity, for my own satisfaction, whether the profession at large cared to know anything about it or not.

Prof. R. D. Mussy, of the Ohio Medical College, Cincinnati, was then one of the leading surgeons, not only of the West, but of the United States. Meeting him one day, about this time, in Columbus, Ohio, and thinking the case would interest him, I sought an interview with him on the subject. He was an exceedingly courteous gentleman on all occasions. While I presented the case to him, he sat quietly with his eyes upon the floor, and was, as I thought, deeply interested. I was then of a boyish appearance. When I had finished, he raised his head, eyed me from head to foot, and said: "*Young man, you ought not to be doing such things.*" At first I felt like sinking through the floor; but in a moment or two resentment came to my relief, and rising with all the dignity I could command, I said, "Good evening, Doctor; you may possibly hear from me again," and retired.

During the next several years I performed successfully six or seven operations. "These were not done in a corner," and while the medical journals refused to publish the reports, it was impossible to keep these cases, with comments upon them, out of the newspapers.

After several of these operations had been performed, being in Cincinnati on a visit, Dr. Mussy sent for me to talk about them. He frankly stated that, while hitherto he had looked with disfavor upon the operation, he was now satisfied it was a justifiable operation, and gave me great encouragement to go on performing it. During the rest of his life Dr. Mussy was one of my best friends.

To return now to the history of the operation: About six months after my first case, as described above, I heard of the case of a young lady, living about twenty miles from me (twenty miles being a greater distance then than now), who at first was charged with immorality by her parents. When time revealed their serious mistake and refuted the unjust charge, they called in several physicians, who treated her for dropsy, but without success. Abandoned by the regular physicians, she fell into the hands of an ignorant "Steam Doctor," who, after failing with his ordinary remedies, proposed one which he said never failed—a "*Ground* Sweat." He prepared a deep and wide hole in the ground, which he heated. He then stripped the girl of all her clothing and wrapped her nude form in the warm skins of sheep which he slaughtered for the purpose. Thus clothed, he placed her in the heated hole in the ground and packed hot sand around her up to her ears. In a day or two the young lady died. He cut her open and found a large sac filled with fluid—the only diagnosis he could make of the case. From the report I received of this case I was satisfied that it was an ovarian tumor.

Soon after the above, I was informed of a case in the hands of Philip J. Buckner, a surgeon who justly enjoyed a more than ordinary local reputation. The patient was a

Mrs. H———, the wife of one of the most prominent politicians in Ohio, who died while in active service as an officer in the Mexican War. After treating her for some time, Dr. Buckner called in Dr. Mussy, of Cincinnati, who at that time was opposed to an operation for the removal of the tumor. They decided upon making an opening about two inches long through the wall of the abdomen into the sac, evacuating its contents and leaving the sac in the abdomen. Into this opening they introduced a large tent, in order to prevent the closing of the wound, and to secure the drainage of the fluid as it reaccumulated. The woman lived nearly a year in this terrible condition. Her suffering became so great that she withdrew the tent and let the wonnd in the abdomen heal. Soon after this she died.

I introduce these cases for the purpose of showing the knowledge and treatment the disease at this time was receiving from the hands of both the learned and the unlearned.

In 1846 I removed from Greenfield to Ripley, Ohio, eight miles from Dr. Buckner. In 1847, three years after my first operation, and a year or more after the death of Mrs. H., Dr. Buckner visited me, saying he had another case of ovarian tumor on his hands, and being dissatisfied with the results in Mrs. H.'s case, he wished to get what information he could in regard to the operation, as I had performed it. I spent a whole day in explaining it and in urging him to perform it. The result was that Dr. Buckner determined to perform the operation. Somewhat to my chagrin, he neither asked me to assist nor to be present. But to my great satisfaction, the operation, which had been performed as I directed, was entirely successful, and the patient made a speedy recovery.

Dr. Buckner soon after came to see me again, stating that he had another case upon which he intended to operate. He described it as a small, hard tumor, projecting a little up out of the pelvic cavity. The woman was very desirous to have it removed, as she had learned of the success of his former operation. I advised him not to operate, as the woman was not suffering seriously from its presence. It was her dread of the possible result, in case it was not removed, which led her to desire the operation.

I had already been called to see a number of those fibroid tumors, and had some knowledge of their nature and growth, and from his description of this case, I judged it to be a fibroid growth, and that for its removal it would require a far more difficult and dangerous operation than ovariotomy. Against my advice, however, he performed the operation, and again without asking me to be present. The patient died that night.

In 1848 a second case fell into my own hands—a Mrs. H., who was the mother of four children, and about thirty years of age. The growth had been exceedingly rapid, she supposing that she was again pregnant. Her family physician was called in and he treated the case, supposing her pregnant; but finding no relief from the treatment, she dismissed him and sent for me. After careful examination I diagnosed her case as ovarian tumor, which had enlarged her about as rapidly as pregnancy would have done. There was a very considerable peritoneal inflammation, causing great tenderness and pain over the whole abdomen.

As soon as I could control the inflammation, which yielded easily to treatment, I told her that her only chance for further relief would be by an operation for the removal of the tumor. To this she at once assented. I invited Dr. Buckner and her former physician, and Dr. Bradford, who had been with Dr. Buckner in his two previous operations, to be present and to assist me. Without chloroform (which at that time had not been introduced in the West, and of which I was afraid), I proceeded with the operation, and performed it very much as I had in my first case, with the exception that, in cutting the ligatures which secured the pedicle, I cut one end short and left the other long, and brought it out at the lower end of the wound in the abdominal cavity. The tumor, as was the case with the former one, was very much adhered to the walls of the abdomen, and in breaking up the adhesions I was a little more careful than I had been

before, so as not to rupture the sac. After the adhesions were broken up, I then carefully opened the sac with a knife, and caught the contents in a basin as it spurted out by compressing the walls of the abdomen. After it was fully collapsed I raised it from its bed in the cavity. I then very carefully and thoroughly searched the abdomen for blood clots, as there had been considerable oozing from the lacerated walls of the abdomen in separating the adhesions. In doing this I had again, undesignedly, cleansed the abdominal cavity from all serum. The patient made a satisfactory and complete recovery.

She has since borne two children without any trouble, and was alive two years ago, enjoying good health.

In fact, it was not until about 1864 that I learned that I had been building far better than I knew; that this fluid was a far more dangerous foe than even blood clots in the operation. My cases up to this time had all been adherent. I had made a free incision and these blood clots were removed, and consequently the abdomen was cleansed of all fluid. About this time I had a case occurring in a young girl only sixteen years old—good condition, simple cyst, free from adhesions and a long slender pedicle. An incision only two inches and a half long enabled me, after tapping the cyst, to withdraw it and secure the pedicle without any air or blood entering the abdominal cavity, and as there were no blood clots to remove, I closed the wound in my usual way. There was no shock following the operation, and I was highly elated with the prospect before me of her speedy recovery, judging from my experience in previous operations—no blood clots, no air in the abdomen, no injury to the peritoneum from cleansing the cavity, only the natural serum remaining. The first day, bright and hopeful; the second day, somewhat dull and listless, pulse quickened and thready; third day, previous day's symptoms intensified with vomiting and rapidly-rising temperature; death early in the fourth day, without pain or tenderness more than in my former case of recovery. She was at her home with surroundings that were altogether favorable for her recovery, and I had not left her house. I was satisfied that it was something done or left undone in that operation that had been instrumental in producing the result. By carefully reviewing the case with all my former cases, I was forced to the conclusion that it was the death and decomposition of that serum that had produced the poisonous effect upon the system.

Soon after this occurred, my attention was called to carbolic acid as an agent for holding organized matter in the combination vital power had given it, and thereby preventing decomposition, until the system had a chance to carry it off through the circulation. I therefore, in some subsequent operations, tried a very weak solution of carbolic acid in cleansing the abdomen, being very careful to thoroughly dry the cavity of all fluid.

After commencing this course, I thought I had made quite an advance in my treatment, as it relieved me of my dread, not only of the serum, but also of the blood, if I failed to get all removed. Before this I had observed that my patients who made the most favorable recoveries had quite free and increased secretions from the kidneys, commencing soon after the operation. This I had looked upon as a favorable symptom, in relieving the circulation of the amount of fluid that it had become accustomed to pour into the cysts, that were now removed, if it was controlled so as not to become a danger in itself, as in my first case.

But I soon found that my carbolic acid, as I thought, was interfering with this secretion, and, after losing one case in which the secretion was suppressed entirely, I abandoned it, and have since depended on thoroughly cleansing the peritoneal cavity of all fluid as an antiseptic, and the kidneys as my best drainage to relieve the system of the poison when formed. This was years before Mr. Lister had brought his plan of using carbolic acid as an antiseptic to the notice of the profession.

To return to the history of the operation: Dr. Buckner now left the neighborhood, went to Cincinnati, commenced practicing there, and I learned that he afterward performed three operations, making in all for him five operations, with two deaths and three recoveries.

Dr. Buckner was a man of a great deal of energy, reported his cases to the Ohio State Medical Society, and frequently called their attention to the operations, although the large majority of the members were opposed to such operations. Not having access to the medical journals, he had his cases published in pamphlet form and distributed over the State, and was thereby a great help in bringing this operation before the profession.

My third and fourth cases followed soon after the second operation.

Dr. Bradford, of Augusta, Ky., who was present at my second operation and had begun to show a love for surgery and to take a deep interest in the operation, was present at my third and fourth cases, both of which made good recoveries. In the third, fourth and fifth cases chloroform was used, and ever afterward.

Notwithstanding the success of these cases, there was no yielding on the part of the older members of the profession in their opposition to the operation, with the exception of Dr. Mussy, as stated above. Dr. Buckner about this time died, and I felt the need of some one to countenance and aid me in these operations, and Dr. Bradford, though living nine miles away, proposed our forming a special partnership for the purpose of performing this operation. Under this special partnership five more operations were performed, the first two of which were successful. The second of these two was the case of Mrs. L———, who was the wife of an iron merchant of Portsmouth, Ohio. While on a visit to her sister in Lowell, Mass., she was taken with fever. Her attending physician discovered, while treating her, that she had an ovarian tumor. As soon as she recovered from the fever he told her of her condition, informing her at the same time that the tumor must be removed in order to save her life. As he considered her then in a good condition for an operation, he advised her to have it performed there, as he knew of no one west of the Alleghany mountains who was capable of performing it, while he had a surgeon there who had performed one or two operations, and could safely remove the tumor.

She readily assented, and sent for her husband. Everything being ready, they commenced the operation, and made an opening in the abdomen eight inches long, down to the tumor. Finding the tumor adhering to the walls of the abdomen throughout the entire length of the opening, they abandoned the operation, and after weeks of suffering on the part of the patient they succeeded in healing the wound. She returned home in November, with the hope that the tumor would give her no future trouble. But during the winter she found it quite rapidly increasing, until in the latter part of April it had become very oppressive to her. Laboring under the impression that no one this side of Philadelphia could perform the operation, she determined to visit that city and, at all hazards, have it done. When about ready to start, she happened to meet Dr. Shackleford, of Portsmouth, Ohio, who told her that Dr. Dunlap could perform it as well as any one in the United States, and recommended her to visit me. This she did, and after learning from her the history of the case as given above, I made an examination and told her it was an ovarian tumor, and that I was confident that I could remove it. I told her, also, that I knew what it was that alarmed her Lowell physicians, viz., the adhesions; and I was satisfied that I could overcome the difficulty.

She assented to my performing the operation on one condition, viz., that when I had commenced the operation I would keep on until I had removed the tumor or taken her life; that she had no desire to live longer if she had to carry that burden. On this condition I undertook the operation. I found the adhesions quite strong, but succeeded

in breaking them down, even those formed by the healing of the wound made by the Lowell surgeon. I made my incision close and parallel to the cicatrix. The chloroform sickened her excessively. She said she could smell and taste it for a week afterward, and during that time her vomiting and nausea gave me a good deal of trouble. After about a week the vomiting and nausea ceased. The case then proceeded with an uninterrupted recovery. Mrs. L——— is still living.

The third and fifth cases of this special partnership were unsuccessful.

During these years I had been looked upon by the reputable part of the profession with no little distrust, some charging that I must be traveling over the country as a quack, hunting up these cases. Some of them had practiced medicine almost a lifetime without seeing a single case. I had always lived up to the rules of the profession, and they could not consistently disown me as one of its members; but, nevertheless, I was made to feel that my fellow practitioners held me under suspicion.

Dr. Fries, of Cincinnati, with whom I had become intimately acquainted after Dr. Buckner's death, became deeply interested in the operation and quite successfully performed it several times. Had he lived, I have no doubt he would have become a most successful ovariotomist.

In 1856 I removed to Springfield, Ohio. Being now near the centre of the State, I attended regularly the Ohio State Medical Society, and the special partnership with Dr. Bradford ceased. By this time I was well known by name in the profession throughout the State; and as very little could be found on the subject in medical literature, the younger members seemed glad of the opportunity to talk with me about this operation, which had now begun to attract the attention of the profession. The medical journals by this time had begun to yield their opposition so far as to admit reports of cases, but generally with adverse criticism. Medical writers began to admit that under certain circumstances the operation was justifiable, but generally in their discussions so reduced the number of these "certain circumstances" that no case was left to operate upon. After 1860 the opposition to the operation by the profession began to give way and my number of operations began rapidly to increase, the per cent. of recoveries keeping from 75 to 80.

As my carefully prepared report of my first case was refused publication, I had resolved never to write another one. I worked on without any desire for notoriety, but simply to do for suffering humanity what I thought my profession required me to do.

Dr. Reeve, of Dayton, Ohio, and Dr. Parvin, of Indianapolis, Ind., now of Philadelphia, both of them young men, became deeply interested in the operation after seeing me perform it, and both entered very earnestly into the defence of the operation, using as their strongest argument for its justification the success which attended my operations. They both soon began and continued to perform the operation successfully themselves. Dr. Byford, of Chicago, was by this time doing good work in the cause, and as other young men came forward I soon found myself surrounded by the active working members of the profession of the West.

After 1860 the Ohio State Medical Society began to urge me to write an article for them on Ovariotomy, which I declined to do till 1868. In that article, which was published in the proceedings of the Ohio Medical Society for that year, I defended the operation as a justifiable one, showing that it could be clearly diagnosed, and that adhesions, although strong and extensive, were no bar to the operation.

John Atlee, of Pennsylvania, who, without my knowledge at the time, had preceded me two months in the operation, and Washington Atlee, who followed in about a year, had to battle with the same opposition to the operation in the East that I had met in the West. They at an early period received aid from Peaslee & Kimball in spreading a more correct knowledge of the operation. Marion Sims was at the same time pushing forward to success an operation in the same field, that had been almost abandoned as a

failure, and gave great aid in overcoming the opposition that we had met. Soon after 1860 Spencer Wells, of London, and Keith, of Edinburgh, Scotland, having adopted the operation, with their brilliant success, began to make rapid inroad upon the opposition that the operation had met with by the profession in England and Europe, and by 1870 all opposition to the operation had ceased, leaving it standing as one among the most brilliant achievements that our profession has made in prolonging life and relieving human suffering. During these forty-four years of my professional life I have performed 315 ovariotomies, with 261 recoveries and 54 deaths, making a per cent. of nearly 83 recoveries.

DISCUSSION.

Dr. G. KIMBALL LOWELL was called upon by the President to give his experience in early ovariotomy in the East. His experience and the opposition he encountered were fully as great. This opposition came, for the most part, from the New England metropolis, Boston. Being called upon to give his first case, he said he did not operate. But he did report the first case in which he did operate some thirty-five or forty years ago. He invited ten physicians. During the operation he met with considerable difficulty in the form of nine cysts, and when he looked about for his assistants all had left but one.

Dr. BOZEMAN reviewed the revival of the operation of ovariotomy after its abandonment by McDowell, of Kentucky, and its condemnation by the profession. Dr. Miller was the first to use chloroform as an anæsthetic in ovariotomy in America. It was in Terre Haute, Ind., and Dr. B. gave the chloroform. He spoke in the highest commendation of Dr. Dunlap's work, and especially for what he had done in recognition of the importance of adhesions.

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# HINTS ON THE CAUSES, PREVENTION AND TREATMENT OF CHRONIC METRITIS.

## CAUSES, PRÉVENTION, ET TRAITEMENT DE LA METRITE CHRONIQUE.

## WINKE ÜBER DIE URSACHEN, VERHINDERUNG UND BEHANDLUNG DER CHRONISCHEN METRITIS.

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Uterine congestions and inflammations are among the most common diseases peculiar to women which the general practitioner and the specialist are called upon to treat. The cause of chronic metritis is more commonly found in acute inflammations and sub-involution of the uterus. I shall here discuss only the cases which result from sub-involution.

When we take into consideration that at the end of a week after parturition, in the normal condition, the uterus weighs about a pound; that at the end of two weeks it weighs about three-fourths of a pound, and that usually the woman is up and about after the tenth day after confinement, and that the ligaments and supports of the uterus, which for months have been inactive, are now required to hold in position and support a uterus weighing from half a pound to a pound, need we longer wonder why so

many cases of displacement, sub-involution and chronic metritis exist? Displacements of any character cause a corresponding degree of interference of circulation of blood and congestion. These include all changes in position, flexions, prolapse, etc., and are usually accompanied by congestive conditions.

Winckel, speaking of the ætiology of chronic metritis, says: "Furthermore, it exists to a greater or less extent in connection with most uterine displacements." He also says: "It seems to be most common after disturbances of the normal involution of the uterus following labor at term, and more especially after abnormal or premature labor." He further says: "These disturbances are partly of traumatic or infectious origin, and partly due to the retention of placental and other portions of the ovum or its envelopes." Now, while these serve as factors in the final production of chronic metritis, yet I believe they are altogether not so important as displacements occurring during the process of normal involution. I further find that these difficulties occur most often in women who have borne a number of children.

The predisposition to displacement shortly after confinement is further augmented by exertion on the part of the mother, such as lifting and handling the infant. If these deductions are correct, there arises the query, Should child-bearing be avoided in order to lessen the number of cases of chronic metritis? This may be answered in the negative. The remedy is in the proper care of the woman who has given birth to a child. Since involution is supposed to be complete, when running a normal course, in six to eight weeks, it would seem only prudent to avoid any active exercise until the end of this period, especially all unnatural positions, the lifting or carrying of weights which to any extent taxes the strength of the patient. The common habit of first sitting up in bed, in which position the patient soon tires, on account of the uncomfortable position necessarily assumed, and the usually yielding, instead of firm, supports placed at the back, aggravating the cramped position, causes the uterus, no doubt, to be frequently displaced, by being crowded out of position by the other abdominal viscera. Having considered the chief cause, and a much overlooked one, of chronic metritis, it is well to discuss briefly the best mode of preventing these displacements. In the first place, in order to maintain the uterus in position, the patient should be instructed to lie upon her back most of the time during the first week after confinement, that when the lateral position is assumed at all, it should be done alternately. The uterus is also better retained in position if, immediately after the expulsion of the secundines, a properly constructed uterine compress be comfortably applied beneath the bandage. The bandage should be, during the first week, readjusted several times a day; after the first week once a day will ordinarily suffice. The patient should not, during the first ten days, be allowed to assume the erect, or even partially erect, posture; after this she may be carefully placed in an easy chair, which will firmly support the back and allow the limbs and entire body an easy and comfortable position. The patient should not, until the end of the first month, be allowed to sit up in bed or lift her infant. Another feature which will tend to hasten involution, and thus render less liable displacements and the resulting chronic metritis, is the daily use of warm water injections, commencing the second or third day after confinement, and continuing while there exists any discharge from the uterus or vagina due to the lying-in state.

The class of remedies usually recommended by various authors for the treatment of chronic metritis are much the same and well known to the profession—exercise for those of sedentary habits, rest for the overworked, sunshine and pure air for those who have been much confined indoors, hot water injections, mineral waters of various kinds, massage, ergot internally, artificial local depletion, iodine locally, etc., all have their places and uses, as have also the various appliances designed for the purpose of keeping or holding the uterus in position.

It is not my purpose to discuss any of these remedies in detail; what I wish to impress upon the profession is the fact that chronic metritis is, in the majority of instances, a local difficulty, and not due to constitutional causes. It should, therefore, be remembered that if such be the case, here, as in all ailments, remedies should be applied to the parts affected as directly as possible, if we would attain prompt and satisfactory relief. For this purpose I desire to recommend, not a new remedy, but one classed low in the list of remedies, if classed at all by authors of the present day, namely, the leech. Winckel, in speaking of the use of leeches in the treatment of acute metritis, says, "Some gynæcologists apply leeches to the abdomen" (might as well apply a blister to a shaven scalp in brain lesion), and then goes on to say, "if we were to ask them whether they would abstract blood locally in phlegmon of the band, they would probably say "no." It seems to me this is an erroneous conclusion, and that the majority of men who had seen the effects of such treatment would say "yes." It would recommend itself as a rational mode of affording relief, and of the good effects of local abstraction of blood in acute or chronic local inflammations there is no doubt. I am not surprised that no good should come from the application of leeches to the abdomen in the treatment of any form of metritis, since the tissues and their vessels are not contiguous.

Hart and Barbour, in their "Manual of Gynæcology," say, under the head of treatment of chronic metritis, "scarification and leeching are now less frequently employed than formerly," giving, however, no reasons why; the impression left in the mind of the reader is, perhaps, that they are not valuable remedies. This conclusion would certainly not be acquieseed in by any one who has had opportunity to observe and patience to employ this much neglected but valuable mode of treatment. The following extract from Atthill, under the treatment of inflammations of the cervix, goes far toward explaining *why* local depletion by leeching, for metritis, especially that form which is due strictly to local causes, has fallen into disuse. He says, "Bear in mind that you are dealing with inflammation, or, at least, congestion of the organ, and it is rational that your first step should be to relieve that congestion by local blood-letting." He further states, "there are two ways of effecting this: the one by the application of leeches, the other by incising or puncturing the cervix. Leeching," he says, "is a very troublesome and tedious process, as well as most uncertain in its results; at one time you cannot get the leeches to take at all, or, at most, not more than one or two; at another they will bite freely, and, perhaps, in spite of all the care you can take, will fasten on the vagina and profuse bleeding may follow. I have seen the bleeding from this cause so profuse as to compel me to plug the vagina; I therefore now rely altogether on the other method."

Now, so far as concerns leeching being a very troublesome process, it is certainly not more than slightly troublesome; as to its being a tedious process, compared with that of puncture or scarification, I admit; as to its being uncertain, it most assuredly is one of the *most* certain modes of depletion in its effects, when properly applied; as to not being able at all times to get the leeches to take, either the parts to which they were to be applied were not properly cleansed or the leeches were not hungry, *i.e.*, had been too recently used or fed; as to being able to get only one or two to take, this should usually be a sufficient number; as to their fastening on the vagina, this should never occur. The proper method of application will always fix them on the precise spot desired; as to the profuse bleeding, there need be no special concern, since, if there should be a continuation of it longer than desired, it may be readily controlled by the application of a small quantity of Monsel's salt, or other styptic, or the bite may be pointedly touched with solid nitrate of silver. The necessity, however, for any application to arrest the bleeding is, indeed, very rare. Believing that local depletion is a principal, if not the chief, remedy to be relied on in the treatment of chronic me-

tritis, and believing that in the natural leech we have the most satisfactory remedy for this purpose when applied directly to the cervix, it may be well to call attention to the points which especially recommend this remedy.

1st. The application can be made conveniently at office or patient's home, and without pain or consciousness on the part of the patient of what is being done.

2d. The application is made directly to the part affected.

3d. The amount of blood taken by one or two leeches is sufficient to decidedly change in the course of fifteen minutes (as I have repeatedly witnessed) the appearance of a congested and livid cervix to that of a normal hue.

4th. The effects of this application are not infrequently continuous for from six to forty-eight hours. A gentle but steady flow continuing, an advantage which seldom, if ever, is derived from either scarification or puncture of the cervix.

5th. The application is entirely free from danger when properly used.

6th. There is no necessity for the patient being kept at rest on account of the treatment in this application, as is necessary in many others.

These are a few of the features recommending the plan of treatment by leeches. Most of all, it is the immediate change in the appearance of the parts, as well as the immediate and permanent relief experienced. I have repeatedly treated cases by suitable uterine retainer and leeches alone (which had been in the hands of other physicians for months and months under the usual constitutional treatment, applications of counter-irritants and the usual local medication, the patients having experienced little, if any, relief of even a temporary nature), who would, immediately after the first application of a few leeches, declare that they already experienced a decided sense of relief, they not being conscious of the nature of the treatment which had been applied.

To obtain these results, hints on the application of leeches to the cervix uteri should prove of advantage.

1st. The imported Swedish leech should be used.

2d. They should be kept in pure, cool water, and should never be fed. The water should be changed once a week in winter and twice or three times in summer, depending somewhat upon the temperature of the water.

3d. The jars should be examined daily, and if any dead leeches are found they must be promptly removed and the jars thoroughly washed and fresh water supplied.

4th. Mode of application: Use any form of speculum—cylindrical is most convenient; after exposing the cervix, cleanse, with clean sponge or absorbent cotton, of all mucus and discharge; bathe the cervix with clean water. All manner of medicated injections must be avoided for at least twenty-four hours prior to attempting the application of leeches.

Make slight puncture, just sufficient to draw blood, at points where you wish to place the leech; or, instead of puncturing, a drop of sweet milk or cream may be placed upon the cervix at the point where the leech is to be applied. Place within the os a packing of absorbent cotton, to guard against the possibility of the leech entering the uterus; grasp the leech with a pair of uterine dressing forceps and place it with its mouth directly to the spot you wish it to take hold of; if, in a few moments, you do not succeed in attaching it, return it into the jar and select another, and so on until you locate as many as you desire, when you will allow them to remain until they voluntarily detach themselves. If there exists the least indication of blood impurity or specific poison, of whatever character, the leeches must not again be used, for obvious reasons. On the other hand, if there is perfect freedom from any such taints, the leeches should immediately be made, upon their detachment, to disgorge the blood. The leech is now placed in a separate jar, and if the disgorgement has been complete, the leech will again be serviceable in about a fortnight. This method of treatment of

the leeches I have found most satisfactory, fewer perishing and sooner serviceable than by any other management. The applications should be made once or twice a week, as would be selected under any plan of local treatment.

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Dr. SIMON FITCH, of Halifax, Nova Scotia, contributed a paper entitled—

## SUGGESTIONS TOWARD IMPROVEMENT OF INTRA-UTERINE AND VAGINAL EXAMINATION AND TREATMENT.

### SUGGESTIONS VERS L'AMÉLIORATION DE L'EXAMEN INTRA-UTERIN ET VAGINAL ET TRAITEMENT.

### RATHSCHLÄGE ZUR VERBESSERUNG DER INTRAUTERIN- UND VAGINALUNTERSUCHUNG UND BEHANDLUNG.

Owing to languor, consequent upon overwork and a fractured scapula, I have been unable to do myself the honor of preparing a paper for this Ninth International Congress, and I beg permission to offer, in apology therefor, a few observations upon the following subjects:—

1. The position of the patient.
2. The gynæcological table.
3. The uterine sound.
4. An efficient form of intra-uterine forceps.
5. The extension of the two and a half inch gauge to all intra-uterine instruments.

In all intra-vaginal practice the position of the patient upon the left side, with the body turned toward the front, is preferable to the dorsal position, in that it leaves the gynæcologist unincumbered by the thighs of the patient, and also permits uninterrupted admission of light into the vagina; now, this semiprone lateral position will be more perfectly available if the patient be raised sufficiently for the gynæcologist to stand at his work.

The table for this purpose is considerably higher than that ordinarily employed, and the corner upon which the hip of the patient is to rest is six inches higher than the corner diagonally opposite, thus placing the pelvis in the attitude most favorable for examinations and operations, and for the direct intromission of light. The corner to be occupied by the pelvis is hinged to the adjacent part of the table, and is supported by a leg, to which it is likewise hinged, so as to be dropped down when the patient is in position, leaving the breech perfectly accessible. This corner dropped, the remainder of the foot of the table gives support to the legs and feet of the patient; and this projection of the table has two knobs, by which a broad leather strap is attached, which may be passed over the legs of the patient, steadying them and securing the position. A thin mattress fastened to the table, the part covering the hinged corner being separate, prevents the patient from slipping. The pillow is cylindrical in shape, like a sofa cushion or short bolster, to bring the head level with the body without raising the shoulder. The patient's left elbow is drawn well back, and the hand placed under the waist, which adjustment brings the forearm, elbow and shoulder upon the table, so as to effectually maintain the semiprone position. A good step to the table is a low wooden-bottomed chair with a high back, by which the patient steadies herself in getting upon the table.

The patient being in the above position, the surgeon's left forefinger—its form

corresponding naturally with the curve of the vagina and the axis of the pelvis—will, better than the right finger, explore, define, adjust and support the intra-pelvic parts, having the right hand free for use of instruments, and aiding it in its operations, and this without crossing of hands or arms.

The uterine sound should be much lighter and more flexible than the ordinary instrument, and is best made of pure silver; the terminal bulb should be as small as that of a common probe, and the adjacent portion slender like a probe, but getting gradually thicker, till it reaches the handle; the handle should be very short; one inch is a sufficient length to facilitate a light and easy use of the instrument and to hinder undue leverage. The long probe is useful for measuring the tortuous canal of the uterus occupied by myoma, but the shank is too yielding for general purposes.

The intra-uterine forceps which I have constructed are nine inches long, with a shaft as slender as the uterine sound, and the blades so fitting into each other as to keep the points in exact contact. By means of this instrument a bit of rag, from half an inch to an inch square, or of any desired size, is held, without possibility of escape, during insertion into and withdrawal from the interior of the womb; then this rag may be instantly detached and another picked up, and thus the uterus can be thoroughly mopped out and liquid medicaments effectually applied; old cotton rag, in consequence of repeated washings, is quite as absorbent as prepared cotton, and is not liable to leave shreds or fibres in the uterus, and, beside being more securely held, is more readily attached and detached than cotton wool on the end of a wire. This forceps has a knob, like that of the uterine sound, two and a half inches from the end, so that the distance to which it may be introduced can be exactly perceived. Every instrument for intra-uterine work, such as the metrotome, curette, dilator, etc., should be furnished with a gauge clearly visible in the speculum and easily felt in digital manipulations; a simple and sufficient index is a globule of solder dropped upon any such instrument two and a half inches from the distal end, and a second drop one inch nearer the handle makes the index more complete.

The dimensions which I find most convenient for the gynæcological table and accompaniments are as follows: Length, three and a half feet; width, two and a half feet; hinged corner, fifteen inches square; height of upper corner, three and a half feet; height of lower corner, three feet; knobs for attachment of leg strap, one on each side of projection, nine inches from base; the pillow, if stuffed full, six inches in diameter; height of chair for steps, fifteen inches.

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Mr. J. E. Burton, M. A., M. R. C. S., Liverpool, Eng., presented a paper entitled—

## WHEN SHALL WE PERFORM CASTRATING OPERATIONS?

### QUAND DEVONS-NOUS FAIRE DES CASTRATIONS?

### WANN SOLLEN WIR DIE CASTRATION VORNEHMEN?

Mr. President and Gentlemen.—When your Secretaries did me the honor of asking for a communication from me to read before this august assembly, I had no difficulty in selecting a subject. The one I have chosen at once thrust itself imperatively forward. Seeing what I have done of the operation of castration of women, "spaying," if you like the word; learning, as I have done, the importance (to herself, at

least) of a woman's sexual organs sneered at, and their removal advocated "with a light heart," and seeing, further, as my opportunities have permitted me to do, that the operation is not a great success therapeutically, the choice I have made can scarcely be matter for surprise.

Permit me a word as regards the title of this paper. Where I have used the expression, "castrating operation," many would have said "removal of uterine appendages." This expression I object to, as it minimizes the operation; it conveys the idea of something accessory and subordinate being removed, a something that a woman can do very well without. It is, therefore, wholly misleading and untruthful, and ought not to be tolerated. Spaying is objected to by others, on no very good grounds, I admit, but it is objected to. Castration of women, *castration des femmes*, *castration der Frauen*, is a term in extensive use, but it does not convey an exact idea of the operation. It has seemed to me that the truth would be conveyed by speaking of it as an operation involving castration or spaying, although the castration may not enter into the intention of the operator. I have therefore called the operations, the propriety of which I shall discuss, castrating operations, as conveying the idea that, whatever the intention of the operation is, it is one that involves castration. This idea, I submit, ought never to be lost sight of.

Such extravagant praises have been lavished upon the operation—in good faith, no doubt, but which we now know to have been undeserved—that it was taken up eagerly; men were soon found only too ready to have recourse to it as a panacea for nearly all the sexual ills of women between the ages of seventeen and fifty. In short, the operation soon began to be performed indiscriminately, not by the generality of operators, but it was performed indiscriminately, and laparatomy became epidemic. Then it became necessary to speak out and denounce the folly that was being perpetrated. The first to take up the matter was the London *Medical Press and Circular*. This was followed by Cole, of New York; then the London *Lancet* followed in the attack on the abuse; then some leaders in gynæcology spoke—few words but weighty—and it was at last made clear that the operation had been carried beyond its legitimate bounds. To determine these legitimate bounds is now a great desideratum. As an attempt toward their determination, I venture to submit the following.

The subject is essentially clinical, and I shall make no apology for passing over all other aspects of it.

When we are called upon to take into consideration the propriety of the operation of removal of the ovaries, or ovaries and tubes, in women, for whatever cause, we ought to bear in mind that the operation is dangerous to life, perhaps more so than ovariotomy, while the majority of the diseases for which it is recommended and performed are not fatal. The operation in these cases, therefore, in which relief of pain is the object, is on a different footing from ovariotomy in a vital particular. In the one case, the patient runs the risk of the operation for the chance of being permanently relieved from a necessarily fatal disease; in the other she runs an equal, if not a greater risk, with the certainty of permanent mutilation, for the chance of being relieved of pains that will cease of themselves in a shorter or longer time. How many of us are in the habit of meeting women of sixty complaining of the pains for which the operation has been performed in younger women?

If the operation were a great therapeutical success; if it were a certain cure for the diseases for which it is recommended; if it were anything like as successful as a therapeutic measure, as its advocates have asserted, it would certainly have great claims upon us; but general experience has shown that it is not. Invaluable as I admit it is in certain cases, its area of usefulness is limited, and the success attending it is uncertain, as is abundantly shown by the great number of present invalids who have undergone its risks.

Even if the operation proves to be a therapeutical suc
nently mutilated by it. It is not too much to demand tha
lates should be carefully weighed in the balance, and the
imperative when the mutilation is of so serious a nature as th
This operation renders the patient an incomplete woman; it
much it may suit the purpose of professed operators (in cont
gists) to clothe matters in a euphemistic dress, it does reduc
tion of a *female eunuch.* This phrase is not euphemistic, it is
makes it correspond more closely than any other to the vulga
ture has become. To the common mind, there is something v
a eunuch, whether male or female; to the educated mind this
not to the professional; but we must not forget that our pati
people, common people, possibly, and that their condition w
have heard of a woman being pointed out by her neighbors
possible to imagine what must be the feelings of a poor creat
spoken of and pointed at? It has been said that the operati
strictly literal and limited sense it cannot be denied that
unsexed by the operation. A woman who is bereft of such
those of ovulation, those in which, as Barnes puts it, reside
menstrual and, indeed, generative process, is to that exten
not only cease to ovulate (a thing they probably care very little
but a certain proportion, about one-half, lose all sexual power
husbands say, lie like logs. Certain great writers and opera
believe that this is so, and others say it does not concern the

Personal inquiry into about sixty cases has shown that wi
operation about fifty per cent. have altogether lost sexual po
it has become noticeably weaker. This loss has, to my knowl
tic unhappiness, and I myself have been placed in an extr
because I did not foretell this possible result before an operat
because I did not know it at the time, as nothing had ever
This is a matter that does not concern the physician, unless
himself the responsibility of possibly destroying the peace o
wife but the husband should be instructed on this point b
undertaken; so that when recovery has taken place, and t
forgotten, the restored health shall not be weighted with
neither husband nor wife anticipated.

In other respects, it is now well known that women are
operation, physically or mentally. Everything about a wom
She is a *femme* whole, and it is the *femmme tout ensemble* tha
This characteristic does not depend on the possession of any
and to say that a woman is *utterly* unsexed by the loss of eve
use language that conveys more to the mind than the actual

From this introduction, it will be evident to my hearers t
of limiting the operation to cases in which it is categoric
which the operation *must* be performed, as distinguished fro
I should like to add, further, that it should never be done
consultation is possible, and never without informing the pa
—husband, mother or father—of the nature of the operatic
sible consequences. If the patient and her friend, then, after
to have the operation performed, the physician is relieved of
cannot then be reproached, as I have been, with not inform
quences.

To turn now to the diseases for which it has been recommended. These are myoma uteri, pyo-, hydro-, and hæmato salpinx, hæmatocele, chronic ovaritis, perimetritis, cystic degeneration of ovaries, certain neuroses.

### I. MYOMA UTERI.

In the first place, there should be no doubt about the accuracy of the diagnosis. In the second, it should be quite certain that the tumor is growing in spite of medicinal treatment. My own observation has shown me that patient and appropriate treatment, if properly carried out, will in the great majority of cases render castration unnecessary. Probably no tumors are so amenable to general treatment as those of the womb. If everything fails, however, it is not only perfectly legitimate and proper, but imperative, to resort to spaying, but the operator must not expect to have no further trouble with the case after the operation is performed. He will not unfrequently be disappointed with the result. If the tumor is at all large, the operation may be very difficult, and even impossible. Some German surgeons assert that it is quite as successful in fibro-cystic tumors as in the ordinary solid myomata.

### II. PYOSALPINX.

Here, as in myomata, the operation may or may not be called for. Most writers speak as if this disease unconditionally demanded removal of the tubes affected. This opinion is founded on the erroneous view, that when once suppuration has taken place in a tube, and both ends are occluded, the pus can never become absorbed, that no period of quiescence can set in, that the pus must inevitably find an exit by bursting somewhere, that, therefore, the patient is in constant danger of her life. But ophthalmology teaches us that pus does become absorbed from the anterior chamber of the eye; if from a part where it can be seen, is it not asserting too much to say that it can never be absorbed from a Fallopian tube, where it is not seen? Again, the micrococci that originate the pus are very short lived, their term of active mischief is soon over, and in a short time a period of quiescence and even retrogression often sets in, when the purulent sac becomes a perfectly harmless guest which it is not wise to evict at any cost. The eviction at this stage of quiescence will not repay the trouble and risk. That a harmless stage can and does often set in, is shown by the large number of tubes shown in our museums, and at our meetings, filled with solid inspissated pus. Such tubes have undergone a natural and spontaneous process of cure, and it is as absurd to remove a cured pyosalpinx as it would be to perform any other work of supererogation without counting the dangers entailed in the process. Not unfrequently, however, the pyosalpinx is accompanied by recurrent attacks of pelvic peritonitis, which threaten life, and when these are present the operation should not be long delayed. There is another class of cases, also, in which, long after all acute symptoms have subsided, and the operation is no longer a life-saving one, such an amount of pain remains, in consequence of adhesions, that the patient is incapacitated from earning a livelihood. I saw such a case the other day, and expressed the opinion that, although operation was not necessary, still if the patient persisted in her demand for relief, after full explanation, the surgeon would not be justified in refusing to operate. This case is typical of a large class, and what I have said regarding it may stand as my view regarding the whole class. In admitting that we may properly operate under conditions in such cases, I go beyond the position taken up by the late lamented Schroeder and Martin, of Berlin, at the Gynæcological Section of the Versammlung Deutscher Naturforscher und Aerzte, 1886, at Berlin. These gentlemen maintained that operation (castration) should be limited to cases in which recurrent attacks of pelvic peritonitis threatened life.

III. HYDROSALPINX, HÆMATOSALPINX AND E

I group these three conditions together, as, in my opinic tion ought not to be performed in any of them. Laparot hæmatocele, or, indeed, in any of them, and drainage in h parts never. Possibly a bleeding part may require a liga excuse for mutilation.

IV. PERIMETRITIS.

Laparotomy may possibly be required in perimetritis, a but further than this it will probably never be necessary to

V. OVARITIS.

There is a form of ovaritis in which the albuginea over a thickened by chronic inflammation that the Graafian vesicle c but develops into a small cyst, sometimes reaching the si sometimes been incorrectly styled cystic degeneration. Pai such cases. It may continue for years. It is characteristic of position; it is as bad when the patient is lying down as whe always referred to one spot, which it never leaves, and it is menial period than during the interval. I have two or thre vesicles by pressure per vaginam. If this cannot be done, h able to use much force in the attempt, I fail to see what ot but to open the abdomen and open the cyst; perhaps it is I have removed the ovary in such cases and the success, the plete. Schroeder removed the diseased portion only of the believe the success obtained was not sufficient to induce him method of treatment. I do not think any other form of ovar the rather rare one of suppurative ovaritis.

VI. CYSTIC DEGENERATION OF OVA

In this form of disease the ovaries will probably be a g lapsed. It is really an early stage of ovarian cystoma. If as it may be, on account of the prolapse, removal may b organ may generally be left until it has attained sufficient on the generally recognized principles.

VII. NEUROSES.

With regard to these, I fully agree with what has been Hegar and Battey, and that in those cases in which the ne origin, operation is called for. I have seen excellent res severe hystero-epilepsy. When the operation is performe ovarian neuralgia in a neurasthenic individual, and when present, the result will probably be disappointing.

Such, in brief outline, are the views I hold as to the pr tions in the various affections I have named. The subject cussion in a paper prepared for such an occasion. The hitherto practiced are left untouched. They have not be told. I am confident they will be better, however, if we d before operation, and I have thought that the time has arr an attempt to do this. With this object in view, I ha thoughts, mostly the outcome of my own observation and p imperfect attempt may lead other surgeons to reconsider t operation as much as possible to those cases in which no o if unheroic or protracted, holds out any prospect of relief.

Dr. MICHAEL O'HARA, of Philadelphia, Pa., contributed a paper, entitled—

## OPERATIVE INTERFERENCE IN EARLY EXTRA-UTERINE PREGNANCY.

### INTERVENTION OPÉRATIVE DANS LA GESTATION EXTRA-UTÉRINE.

### OPERATIVER EINGRIFF IN FRÜHER EXTRAUTERINSCHWANGERSCHAFT.

My paper does not pretend to give a systematic account of extra-uterine pregnancy, but rather to present two cases in which all the moot points for discussion occurred; and in the treatment of which, I think at this moment, mistakes were made. Our mistakes are goodstepping stones to reach the truth. The symptoms and treatment will be given as we proceed, after which we will give our conclusions. The title, Early Extra-uterine Pregnancy, means prior to the fifth month.

On January 12th, 1878, visited W. M., a hearty English woman, twenty-nine years of age. She had had three full births and an abortion, at two months, near three years previously. Her last menstruation occurred September 29th, 1877. She has a conviction of pregnancy, and that there is something wrong. Two months ago she began to feel abdominal pains, off and on; recently these increased in severity, compelling the recumbent position for ease. She was attacked first with bowel obstruction and retention of urine, two months ago. Since that had much ardor urinæ. There has been, for two months, sharp, stinging, distensile pelvic pains and rectal distress. She never had before, or in this pregnancy, sick stomach, and there are no mammary symptoms of pregnancy. Recently she has bearing-down pains.

Per vaginam, there is a tumor, appearing to be a retroflexed gravid uterus. The examination provoked great distress. She required constant use of narcotics. As she had aborted before, at two months, and had so much suffering in this pregnancy, I was in doubt, and asked Dr. J. G. Allen to see her, the same evening.

The tumor seemed so closely attached to the uterus, that it was difficult at this time to say whether it was a tumor or a gravid, retroflexed uterus. It could easily be thought a retroflexion, from the seeming curvature of the neck backward. There was no ballottement, and it was too tender for a gravid uterus. Trying to elevate the tumor in the knee-elbow position, there was slight mobility; too much pain was given to persist. The neck seemed a circle moderately close to the pubis. The abdominal walls are so loaded with fat that you cannot palpate a uterus above the pubis. We, as yet, only suspected extra-uterine fœtation, and thought it well to palliate and wait.

On the 14th the patient was not suffering, and it was thought injudicious to use the sound until we had an assured diagnosis.

On the 20th she passed a decidua, a complete cast of the uterine cavity, with labor pains, hemorrhage, and clots.

On the 21st examination shows the tumor in the same position, pressing on the rectum. Cannot as yet ascertain the corpus uteri. The tumor has ascended a little, and gives less pressure pains in the pelvis. The sound enters four and a half inches, and is felt above the brim of the pelvis. The uterus is to the left of the median line. A retro-uterine tumor, not moving with the uterus and sound, completed a diagnosis of extra-uterine pregnancy.

On the 25th Dr. Albert H. Smith met us. The patient desired immediate relief. The tumor is one inch lower, resting nearly on the floor of the pelvis. The womb is rotating, and as it descends the neck is drawn up and the fundus is pulled back. The various means of avoiding the rupture of the sac and death from internal hemorrhage were fully considered.

Against electro-puncture we were unanimous ; narcotic i

Dr. Allen was for the destruction of the fœtus by electrol was, that the mother would not consent to deprive the fœt there was imminent danger of rupture, I feared electricity A. H. Smith, in view of the accessibility of the tumor, and drainage, preferred vaginal section, in which we concurred wait until the 27th.

This operation was performed with the Paquelin cautery, inserted. The placenta was encountered and there was pro off the placenta stopped the bleeding, after enlarging the op

The sac had ruptured, and the fœtus was found in the re of the left side. There were no clots and no further bleedin tion, eighty-six hours after the operation. Upon post-mort cyst wall was present. The walls seemed to be made up, an posterior face of the uterus ; posteriorly, of rectum, sigmoid exudation. The omentum was dragged down and made pa The interior of the sac was darkened and softened. The an ible. There were signs of recent peritoneal effusion and old tubes were hermetically sealed.

I reported this case to the Philadelphia Obstetrical S During the discussion thereupon it was astonishing to find to have made incorrect diagnoses in such cases. Cases were uterine pregnancy was overlooked, and diagnoses were mad peritonitis, normal pregnancy with complete abortion, and arrived at no diagnosis, the patient dying of internal hemor

One gentleman considered the diagnosis uncertain until off, and yet he seemed sure of having cured cases by electrol

I would prefer abdominal section in any case where the assured. I think the cyst in this case had ruptured before not know it, and that was the cause of the peritonitis, and so much, and should have performed at once abdominal secti have probably ruptured the sac, if it had not already occurr growing fœtus; that if electrolysis is used, it ought to be at an nosis can seldom be made with accuracy until accidents sup leans to extra-uterine pregnancy, we should give the patien tory incision, rather than let her probably die through delay only certain cure.

As to electricity, most authors advocate the galvanic cur have reported successful results. Blackwood † prefers farad the embryo, and disrupt it molecularly; he insists on e applied. Rockwell recommends repeated séances as needed in France. Apostoli states that the constant current has su has failed. Some admit that there is danger of rupture of t if the symptoms of colicky pains and shock supervene, due t peritoneal covering of the sac, then resort to laparotomy.

The second case came under my observation in 1885. the patient was seized with severe rectal tenesmus, and ago both flanks and along the right leg and arm. She fainte

* "Medical and Surgical Electricity," Wood & Co., N. Y.—*Me*

† *Medical Bulletin*, May, 1875; *Medical Times*, July 10th, 18 *and Surgical Reporter*, September 3d, 1887.

Two hours later, when seen, she was in a collapse, almost pulseless, and with great pallor and cold sweats. I diagnosed internal hemorrhage, due to rupture of the fallopian tube, in the fifth week of extra-uterine pregnancy.

I directed stimulants, opiates, and external warmth. The symptoms of shock continued for about forty-eight hours, when a partial reaction occurred; pelvic pains continued, but less intense, and vomiting supervened. There were no marked symptoms of peritonitis.

The patient remained in about the same condition during the next week, without symptoms of a recurrence of the internal hemorrhage. She now became jaundiced. Owing to the fear of bringing on a new hemorrhage, a careful bimanual examination was not resorted to up to this date. The vaginal examination showed the uterus enlarged and softened.

Three weeks later a distinct tumor was recognized, extending to the level of the umbilicus, and to the left of the abdomen. A uterine hemorrhage now appeared, greatly exhausting the patient. Chills, with high temperatures, indicated septic infection.

It was evident that the tumor contained blood undergoing degeneration, with suppuration. Four weeks after the symptoms of rupture of the tube, a laparotomy was performed by Dr. W. H. Parish. He advocated opening direct into the tumor, above Poupart's ligament, but, in deference to the views of Dr. R. P. Harris, an exploratory median incision was made, and the general peritoneum found in good condition. A second incision was made, above Poupart's ligament, opening into the tumor. About a quart of coagulæ, bloody fluid and pus escaped.

The tumor cavity was carefully cleansed, the fibrinous masses being removed with the fingers.

The curette was not used, because of the thin upper wall, and for the same reason the cavity was not packed. This artificial cyst was washed out with antiseptic fluid, and a drainage tube introduced. The median incision was closed with sutures.

A shrinkage of the cyst walls occurred, though slowly. The patient improved generally, but at intervals hemorrhage occurred simultaneously from the uterus and through the drainage tube, sufficient to keep the patient in a feeble condition, until she was seized with a more severe bleeding, simultaneously from the cyst cavity, from the uterus and from the rectum.

Examination under ether now showed masses of blood coagula had re-formed in the cyst, and that doubtless there was an opening between the cyst cavity and the large bowel, and a communication between the cyst cavity and the uterine cavity, through the fallopian tube. The cyst cavity was now curetted and packed with lint saturated with phenol sodique. Subsequent to this fecal matter and a gall-stone of small size, and shape of a molar tooth, escaped from the incision.

In six weeks from the date of packing the patient had entirely recovered; the fistulous communication having healed and entirely closed, without operative interference.

In summary, this case was evidently one of extra-uterine gestation, without symptoms other than those of normal pregnancy until the rupture of the tube occurred. The hemorrhage was extra-peritoneal. It is plain, also, that an early operative interference should have been resorted to.

The frequency with which laparotomy has now been performed after rupture of the tube, with the recovery of the patient, and the almost invariable death of the patient after rupture without this operation, render it no longer excusable to refuse or defer prompt interference in this manner.

Extra-peritoneal hemorrhage not becoming intra-peritoneal is very rare, and even in such cases prompt laparotomy should be performed. Prior to the fifth month, in my

opinion, the diagnosis of extra-uterine gestation having b
should be performed before rupture, if practicable, and if ru
diately thereafter.

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Dr. GRAILY HEWITT, London, England, read a paper

## THE RELATION BETWEEN CHANGES IN
## CHANGES IN THE SHAPE OF TH

### LE RAPPORT ENTRE LES CHANGEMENTS DANS LES TI
### TIONS DANS LA FORME DE L'UTÉ

### DAS VERHÄLTNISS ZWISCHEN VERÄNDERUNGEN IN DEN
### DERUNGEN IN DER GESTALT DES UTE

The frequent association of abnormal conditions of the
alterations in the shape of the organ, of marked character,
gynæcological writers. By some the association is regarde
others it is admitted that the morbid tissue changes of the
chronic metritis has been generally employed, are more d
cure when associated with marked flexions of the uterus.
view that flexions have a considerable influence, not only
and endometritis, but in perpetuating and intensifying thes

Before considering the textural changes which are prese
eased, it is necessary to make a few remarks on the diagnosi
and on the diagnosis of presence of alterations of form and
has sometimes been made a matter of reproach by writers o
of shape and position of the uterus described as observed
found in the post-mortem room, and criticisms have been co
a charge of error of observation. It appears to have been a
met with during life would be equally evident after death.
which render it evident that this idea is not altogether corr

At a meeting of German physicians at Freiburg, in 188
flexion of the uterus, stated that by bimanual examinatio
anteflexion several times, but the uteri subsequently dissec
This "surprising" result was found many times. In two h
anteflexion was found only four times.

More recently, Stratz* has written a paper on the norm
Struck with the discrepancies between the statements of an
he endeavored to procure evidence by examining the same s
death. This was done, and in five cases where the uteru
during life, it was found after death lying in the backward
position he attributes to the post-mortem relaxation of th
ments in the uterus, to the cessation of the circulation, to th
ordinarily placed in after death, and to the pressure of th
in the intestines. These observations of Stratz, coupled wi

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* Die Normale Lage des Uterus. *Zeits. f. Geb. und Gy*

me to throw considerable light on various points connected with the study of the textural changes in the uterus, and they go far to explain the discrepancies in regard to the position and shape of the uterus which have been above alluded to. It has always appeared to me that for really satisfactory evidence as to the condition of the uterus we must, to a very great extent, rely on carefully performed examinations during life; and there are good reasons for attaching even greater importance to examinations made during life in cases where questions as to the shape, position and physical condition of the uterus are to be determined.

The term "chronic metritis" is one which is used to include various conditions of the uterus, some of which do not appear to be at all of an inflammatory character. The term cannot, perhaps, be got rid of at present, but it appears that there are changes of the tissues of the uterus which can scarcely be included correctly under the designation of "chronic metritis;" or, to put the matter in a different manner, it may be stated that certain alterations in the uterine tissues which are not of an inflammatory character may be observed in certain cases, possibly in a great number of cases, to precede conditions to which the term chronic metritis would be fairly applicable.

It is, of itself, evident that the textural changes of the uterus will be most advantageously studied when they are in their initial stage, when complications are less liable to be observed, and when, consequently, their relation to alterations of shape or position of the uterus may be more easily defined.

I would, in the first place, direct attention to a peculiar condition of the uterine tissues which is liable to present itself at an early period in cases where uterine symptoms have begun to show themselves. Some years ago I made the observation that the tissues of the cervix were very frequently found in a state of unusual softness, that the normal, rather hard texture of the os uteri was often changed in this particular in a very decided manner. Seeking for an explanation of this circumstance, it was evident that this particular change was met with in cases when the patient was generally in a feeble state. It was not associated with any special tenderness or sign of inflammation, but appeared to proceed from a want of tone or relaxation of the part in question. I found, further, that it was frequently associated with presence of marked flexion of the uterus. In 1877 I read a paper on "Abnormal Softness of the Uterus as a Factor in the Etiology of Uterine Distortions and as a Cause of Impairment of Locomotion," at the Meeting of the British Medical Association, at Manchester, embodying the conclusions arrived at and giving details of twelve cases illustrative of the points mentioned. This condition of the uterus, which I had not found described by former observers, I was for some time at a loss to explain, but further observation seemed to offer conclusive evidence that it is always associated with a general feebleness of nutrition of the body at large, which may be appropriately designated as "chronic starvation," and the explanation was suggested that the uterus, participating in this general inadequacy of nutrition action, becomes soft to the touch, probably owing to the anæmia of the tissues, as well as defective growth and rotundity of the muscular elements present in the tissues. Careful clinical observation of the progress of several cases under treatment for a considerable time gave proofs of the accuracy of the explanation, for it was found that under the influence of a generous nutrition treatment the uterus lost its softness and acquired a normal degree of firmness, though in some cases this result was only obtained by persevering in the treatment for a considerable time. During the ten years which have elapsed since my paper was published, the condition described as undue softness of the uterus has been distinctly recognized by other observers—by Fritsch, by Hildebrandt and others.

Quite recently a paper, by Dr. Chas. D. Scudder, was kindly forwarded to me by the author, entitled, "On Mollities Uteri," in which the author describes the same condition under the designation "mollities uteri," and mentions several cases in which

the condition was observed. As no mention is made of my p
ago, and the subject of which was more recently further dev
tion of my book on "Diseases of Women," it seems probab
unaware of what I had written on the subject, and this, th
independently made observations he has recorded, and which
as those I had arrived at. The condition described in the pa
Montreal, yesterday, as want of tone of the uterus and, as c
the uterine musculæ, is evidently the same.

The condition which I have described as undue softness
degrees. It is sometimes very marked, indeed, so much s
cervix, and presumably of the body of the uterus also, have
the os uteri at the ninth month of pregnancy. There are g
ward. The condition is very easily recognizable by one accu
digital examinations of the uterus. In its simplest form the
tion, but the cervix so softened appears liable to undergo swell
and it is not uncommon to find, when the softness has ex
cervix is, as a whole, larger than usual. It may be supposed
stances, we have a condition which may be termed congesti
condition, which is accurately designated as softness.

This particular tissue change, undue softness of the uteru
peculiar importance, because observation shows that it is as
flexibility of the uterus, and its presence offers a ready expl
flexion of the uterus and to its exaggeration under certai
seems to me probable that its recognition will prove a materi
the early history of alterations in the shape of the uterus, w
chronic and enduring, but which are in the beginning tem
under favorable conditions, evanescent.

In a paper read at the Brighton meeting of the British Me
"On the Early History and Etiology of Uterine Flexions," i
the large majority of cases of acute suffering from flexion, ther
the influence of accident, strain, fall, or other similar cause,
malady, the suffering dating from the time of such accident, st
referred to were cases of retroflexion of the uterus; but
could be given of the operation of these traumatic influences
ting existing flexions that the case becomes forthwith one of
That accidents are capable of suddenly displacing and forcibly
of no doubt. When the uterus possesses its normal resisting
by the accident will, no doubt, be less than when the uterus a
loose, relaxed condition. The force brought to bear on th
thus giving rise to marked flexion, may be a slowly acting o
manner in which most chronic flexions do originate, viz.: l
certain forces, which latter are intensified from time to time
sudden and rapid effect is produced by a more powerful dis
the previous condition of the uterine tissues influences the
degree.

This unusual softness of the uterus is a condition which
pathological, cannot be regarded as an indication of perfec
presence allows of the uterus assuming a greater degree of fle
be present.

It appears very probable that there are very many cases
at the age of puberty is in a state short of perfect health, a
may be markedly and unusually flexible, owing to the softn

flexion present has not yet become permanent. Later on one of two things will be likely to happen, either recovery of the tone and resistance of the tissues, with loss of the tendency to unusual flexion, or further accentuation of the bent state of the uterus, with acquirement of a permanently flexed condition of the organ, and various secondary effects which it is unnecessary to allude to at this moment. It is in accordance with observation, that an abnormally flexible state of the uterus may continue to be present for a long period, and that so long as this organ does not become set or fixed in its flexed state, there may be no very marked symptoms. And in such instances the individual is practically considered to be in a state of health. Health is, however, a relative term. How few are perfectly well! How many suffer slightly but do not complain! How often do we find that, when first consulted, the patient has been really presenting symptoms for a long time, but was, nevertheless, believed to be in a state of health. Whether, however, flexions of the uterus be considered important or not, clinical evidence has led me to form the conclusion that there is an exceedingly close connection between undue softness of the uterus and a liability to marked flexion, and further, that associated with undue softness of the uterus, there is to be invariably detected a distinct feebleness and inactivity of the nutrition processes in the system generally.

It may be conceded that in a certain number of cases there are other explanations of the presence of flexions than a simple softness of the uterus. One of these is what may be designated persistence of the pre-pubertal condition of the uterus, in which cases the uterus after the age of puberty has arrived fails to take on the usual changes, remains small and considerably anteflexed. I have seen such cases. There is another class of cases in which the uterus, apparently normal in other respects, appears to have unusually thin parietes. Under these circumstances the flexibility of the uterus will be abnormal in degree. The condition appears to be congenital, and how far it is to be regarded as produced by want of development or by inadequate nutritional activity at the critical period of puberty seems to be doubtful. Lastly, there are, no doubt, some few cases in which the flexion is a purely congenital one.

I have hitherto spoken of undue softness of the uterus as observed in nulliparæ. But during childbed there is also observed a physical condition of the uterus of peculiar character. The uterus is then also soft and what may be termed "mouldable." In cases where the post-puerperal involution is protracted this softness is present for too long a period. And inasmuch as defective uterine involution is generally associated with general feebleness, there is an analogy in this respect between the nulliparous softness and the deficient uterine puerperal involution.

As illustrative of the foregoing remarks I will read short particulars of two cases, which exhibit the action of the clinical factor undue softness in relation to change of shape of the uterus; one an instance of nulliparous softness and the other an instance of undue softness in a multiparous subject.

Case I.—Mrs. T., æt. twenty, consulted me first, seven months after marriage. She was in a state of great feebleness and weakness; menstruation was irregular and she was incapable of any exertion, in consequence of the pain and discomfort produced by movement. Though belonging to a wealthy family and surrounded with luxuries, she took little nourishing food. The uterus was found on examination to be markedly anteflexed and very soft and non-resistant to the touch. For some time no particular local treatment was adopted, but a better dietary insisted on. This treatment had but little effect. She was then put under a stricter regimen and very carefully fed, and at the same time a stem pessary was employed, the uterus having been previously a little dilated and straightened by the sound. She wore a stem pessary for a while, and later on a cradle pessary. After a little over two years pregnancy occurred and ended favorably. On resuming her ordinary life the former symptoms returned, and the uterus

was again found in a state of marked anteflexion. A cradl
and a second pregnancy followed, the pregnancy occurring, as
wearing the pessary. Following the second pregnancy, agai
and a third time the case was treated successfully by the crad
interval and later on another pregnancy. Following the f
repetition of pain and locomotive inefficiency occurred. O
found that the uterus was not in a state of anteflexion, but t
flexed. This is a point of considerable interest, as showing a
soft state of the uterus was the explanation of the flexion.
employed and a fifth child resulted. Since that time a sixth
pregnancy again preceded by use of a Hodge pessary. The
had been under observation and the exactness of the obser
important illustration of the history of acute flexion in a cas
uterus were in a soft, non-resistant state. The uterus never
but the treatment was successful in facilitating the occurrenc
and conferring on the patient the capability of enjoyment of
maternal and other duties. The conversion of the case fron
of retroflexion probably indicates the presence of unusual te
uterus at the junction of the body and cervix.

CASE II.—The following is an instance of the presence of
uterus in a patient who, after being confined with her third c
months previous to seeking advice. Age 30; has been treated
to prolapsus and entire incapability of walking. She is very f
No appetite. The uterus was found retroverted and the peri
ordinary pessary cannot be kept in situ. An operation was
perineum, and afterward a Hodge pessary successfully empl
was for a time restored, but it was soon found that the
posteriorly fell into a state of anteflexion, and great difficulty
her with a pessary sufficient to prevent retroversion and
producing anteflexion. The patient could walk whenever t
maintaining the intermediate position, but the uterus was s
in either direction. Finally a double-acting instrument wa
successful. The great softness of the uterus was undoubte
with the feeble nutrition of the system generally, in which t

CONNECTION BETWEEN ABNORMAL SOFTNESS AND

I have refrained, in speaking of undue softness of the u
"chronic metritis," but it will now be necessary to consid
condition of "softness" bears to the general chronic inflamm
changes classed under the head of chronic metritis. I ho
softness is a condition which predisposes to chronic metritis,
metritis. In order that it may become chronic metritis it ap
be added. When congestion occurs in a uterus which is un
metritis may be considered applicable. This is, of course, a
it represents in my mind a distinction of practical and thera

In the very interesting papers recently published by Dr.
"Endometritis," a theory is very ably sustained, to the foll
menstrual period there occurs a considerable tissue growth i
there follows an involution of the uterus after each menstru
involution observed after childbirth. And there is liabl
termed a defective menstrual involution as well as a defectiv
puerperal subinvolution Jacobi believes the uterine tissues t

trated by large blood vessels and lymphatic spaces, composed of muscular fibres endowed with most incomplete tonicity and contractile power—upon these peculiarities combined depend the characteristic menorrhagia and leucorrhœa, as also the flexion, which are of such common occurrence. The observations of Foerster, and of Cornil and Ranvier are quoted to show that the lesions of parenchymatous metritis are identical with those of various forms of fibro-muscular hypertrophy, the first stage of parenchymatous metritis being thus quite distinct from inflammation. Jacobi considers the proximate cause is the presence of an excess of venous blood in the parenchyma as well as in the endometrium; if the contractions are feeble the venous blood is not shut off; in this state of uterine inertia necessary disintegration is not effected. Hence, accumulations of detritus around such sinuses as have escaped primary obliteration. So of the lymphatic spaces. Jacobi's remarks on the interfering power of debility are strikingly in agreement with what I have myself observed, viz: that the uterine inertia described is correlated with any cause of debility, general or local. Obviously this has a very important bearing on the question of the proper dietary in childbed. Jacobi gives drawings of the microscopic appearances, particularly in a case of severe retroflexion with metritis, showing multiplication of blood vessels, dilatation of lymphatics, proliferation of a scantily nucleated cellular connective tissue, chiefly around both sets of nutrient canals, also occasional infiltration of parenchyma, constituting a "perivascular sclerosis." This was associated with enlarged endothehial lined spaces in the parenchyma, exactly at the inferior angle of flexion. This latter observation is important, as showing apparently the effects of the compression of the tissues at the seat of the flexion. Jacobi believes this perivascular sclerosis prevents the contraction of the vessels and thus prolongs the venous congestion. In the next place Jacobi points out the analogy of chronic metritis superinduced on puerperal subinvolution, and chronic metritis following on *menstrual* subinvolution. Mayerhofer was of opinion that in chlorosis and anæmia there is chronic metritis. This Jacobi attributes to the diminished *vis a tergo* of the arterial blood. The endometrium remains also congested, its disintegration is imperfectly effected, the sub-epithelial adenoid elements, with glands and vessels, remain in relative excess. Jacobi considers it probable that perivascular sclerosis occurs in the cervix of sterile married women. This author then goes on to speak of anteflexion and metritis, and describes one form in which the walls of the uterus remain soft, another in which there is a hardening process present. It seems probable that in the variety described with a soft uterus the same condition is present as that which I have described as undue softness. Later on distressing parasthesias are liable to be observed, anorexia, nausea, dyspepsia, headache, etc., and exaltation of sensory and emotional elements.

Jacobi's opinion is that chronic metritis in nulliparæ arises from chronic cervical catarrh, which leads to menstrual subinvolution. That cervical catarrh may lead to endometritis it is impossible to deny, but Jacobi's own arguments seem to tend to show that the general sluggishness of the blood current associated with general defective nutrition, are sufficient to give rise to that obstructive congestion, as it may be termed, which constitutes the first stage of "menstrual subinvolution."

Jacobi in several places alludes to the presence of flexions in cases of chronic metritis, and, indeed, says that "the dislocations and deformities of the uterus stand in more complex relation to its primitive morbid processes than is recognized by those who refer them to increased weight of the organ." In this remark I quite concur, and would add further that the primary congestion appears to me to be largely due to these dislocations and deformities. In some of the cases related by Jacobi (such as Case 30), there is evidence, hardly disputable, offered in the facts related, that the attack of illness which came on immediately after severe exertion at a menstrual period was caused by retroflexion there and then produced or much exaggerated. Yet, Jacobi attributes the effects to uterine catarrh. I have seen many similar cases where there was coincidence

of acute congestion with occurrence of production or exag
clinical facts must be allowed to overweigh *a priori* argumen
rial supply is so arranged that congestion cannot occur, as D
I do not admit, in the face of the numerous practical proofs t
my experience has furnished me.

One class of facts I would mention in referring to this d
known that the os uteri not unfrequently presents a swolle
riorly alone or posteriorly alone. I believe that in most
swollen in cases of anteflexion, while the posterior lip h
swollen in cases of retroflexion. In some instances both are
in all the cases supposed markedly flexed. It is necessary
sideration cases in which the cervix has been lacerated duri
the circulation at the os uteri is disturbed in other ways. N
local swellings of the os, which I have above described, do
of marked flexion, that is of itself a striking proof of the eff
producing in the circulation and in giving rise to congestion
clinical experience as to the truth of these statements. And
the os uteri in many cases is sufficiently marked to give g
presence of flexion, either forward or backward, as the case m
edition of my book, described a remarkable and typical ca
uterus was found, by myself and another observer, to be very
ever the uterus became decidedly anteflexed, whereas, by r
gestion and swelling promptly disappeared. This last case is
flexion bringing about congestion of the body of the uterus
equally well marked cases. I wish particularly to direct
have just described, because the condition of the endon
notice. It was a case in which the patient suffered from ve
and the uterine interior presented fungous growths of consid
it was believed to be a case of malignant nature before I sa
observation the uterus was dilated in order to excise the gro
treatment (consisting of rest and daily pushing up the fundus
effect on the uterine interior, that the fungous growths were
appeared. This case is a well-marked illustration of the
believe subsists between the presence of acute uterine conges
duction of fungous hypertrophy of the endometrium.

Jacobi's argument that in endometritis and chronic metri
important part etiologically, is founded on the idea put forwa
ence to defective menstrual subinvolution, and the prolongati
is stated, due to this. The blood current has unquestionably
giving rise to this defective action of the uterus. But the
and, indeed, the facts related by Jacobi, show incontestably t
and displacements of the uterus have at least an equal effect
ing uterine congestion.

I turn for a moment to the consideration of *endometritis.*
in the metropolis of Great Britain, Dr. Matthews Duncan, st
his assistant, looked for a case and did not succeed in findi
months' hospital experience. The cases cannot, therefore,
always appeared to me, indeed, that if we exclude the spe
gonorrhœa, and the possible influence of syphilis, the cases are
properly speaking, can be said to exist. Jacobi traces the di
of catarrh of the cervix, which, we may conceive, is quite
but, as pointed out above, there are other explanations whi

factory. In a certain number of instances I have met with patients suffering from offensive discharge from the uterus, or from occasional discharges of purulent fluid from the vagina, which unquestionably proceeded from the uterine interior. In these cases the uterus was acutely flexed or much anteverted, and it was found that by taking measures to straighten or correct the position of the uterus the offensive discharge or the puriform discharge ceased. These cases were cases of endometritis set up and perpetuated by retention and decomposition of discharges in utero. They were cases of defective drainage, in fact, of the uterus. The order of events in such cases is congestion and flexion of the uterus, excessive secretion in utero or hypertrophic congestion of uterine mucous membrane, retention of discharges, putrescence and further irritation of uterine interior by these products.

A specimen of cases such as these is the following, quite recently observed. In May, 1886, I was consulted by a single lady, aged 27, who had for upward of three years suffered from an offensive vaginal discharge, particularly after each menstrual period. She was of very active habits. I found the uterus acutely retroflexed and low down. A Hodge-shaped pessary was adjusted. The offensive discharge forthwith ceased and the patient was relieved of that and other discomforts, constipation, pains after walking, etc., almost directly afterward. In May of 1887, one year subsequently, the patient reported herself still well, the former unpleasant symptoms having entirely ceased. During the year the pessary had been continued to be employed uninterruptedly.

There is one quality which the uterus possesses which seems to have attracted less attention than it deserves, viz: The great plasticity of the tissues. Of this quality we have proof, in the success which attends well directed efforts to reduce the chronic inverted uterus. Here the change of shape of the uterus is most complete, the inversion occurring when the tissues of the uterus are soft, and the cure being effected when they are more firm and dense. The hypertrophic enlargements of the os uteri, and the hypertrophic state of the body of the uterus so frequently met with, associated with severe flexions, in part result from this plasticity of the uterus, and it is probable that the atrophy of the middle portion of the uterine wall, also, often observed in such cases, is the result of compression of unduly softened tissues at that spot.

Atrophy and thinning of the uterine wall in connection with the presence of flexion, was, as is well known, long ago observed by Virchow. It does not appear that this atrophy always occurs ; in fact, sometimes the walls are thicker than usual at the seat of the flexion. The physical effect of acute flexion is necessarily, as may be shown in a sponge model of the uterus, to bring about compression of tissues at the seat of flexion. In several cases of acute anteflexion I have found a projecting transverse ridge in the hollow of the flexion, evidently produced by squeezing out of the tissues at this situation. Atrophy of the kind described enhances the difficulty in treating such cases.

The following general conclusions in reference to the question under discussion are submitted as being most in conformity with clinical facts:—

1. Undue softness of the uterus associated with defective nutrition, either in nulliparous or in parous cases, usually precedes flexion. 2. Flexion then occurs. 3. The flexed and soft uterus readily becomes congested. 4. The congested, flexed uterus generally becomes hypertrophied. 5. The flexion, now permanent, is an obstacle to removal of congestion. 6. Compression of uterine tissue caused by flexion, is an important element in chronic metritis. Endometritis is, as a rule a secondary effect of chronic general congestion of the uterus.

DISCUSSION.

Dr. BALLS-HEADLEY, of Melbourne, Australia, said-
me the honor of desiring me to open the discussion on Dr.
"The Relations between Change in the Tissues, and Ch
Uterus," which I feel the greater, from the high position
acter of the paper.

It seems to me that the changes in tissue usually pre
except in accidental displacements; as, for instance, wh
causes a retroversion, or flexion, or sometimes presses the u
which inflammatory or atioptic changes in tissue may supe
ceding. I would divide these cases into two classes, th
pregnant, and those who have. Of the first class, those
nant, the normal position of the immature uterus is ante
frequently persists; some of these cases we have an oppor
it usually does not hinder impregnation, and may be re
In others, the angle of this flexion hinders the escape of
which is aggravated by the thickened state of the membra
induced a partial retention of fluids in the body of the ut
traction for its expulsion. Hence, congestion or inflam
appendages, and frequently specially of the uterine lining
ing to the os, protrudes the membrane, and everts the lip
traction of the cervix, and thus aggravating the eversion.
and pressure of and on, the everted membrane, ulceratio
that a condition may result exactly similar in appearance
the cervix. Hence the changes in the tissues, in accorda
period of the inflammation. At first punctures of the os
later scarcely at all, showing at first engorgement of the
of the increased weight, because of a flabby state of gene
Hence result changes in the shape; the anteflexion m
weight bearing it downward, and the full bladder pressi
axis of the pelvis, and become perpendicular, retroverted,

In the second class, those who have been pregnant,
Woman's Hospital at Melbourne, that forty per cent. of th
laceration of the cervix. This condition, when not heal
cause those rises in temperature so frequent about the
will depend on the course and degree of inflammation thu
when the woman gets about in from ten to twenty-one d
are yet unhealed, and the uterus, still in process of i
requires at least a month, is heavy, and measures not mo
in the correct position the uterus presses down, the lace
apart and become more irritable, hyperplastic formations
existent subinvolution produce a weight beyond the pow
nature has arranged; thus the uterus descends in the p
becomes perpendicular, retroverted or retroflexed, by pres
Anteflexion occasionally occurs where the descent has not
in tissue coincide with the original degree of inflammati
engorgement, and delayed involution with fatty degeneratio
ment of areolar hyperplasia, especially about the lips an
flabby, anæmic, large, heavy organ, not bleeding when pu

brane continues to secrete more or less largely, and by weakening the strength of the uterus and of the general condition in those who have been pregnant, as well as those who have not—simulating fistula in ano—both may lead to wasting disease. As to treatment, which was not however referred to by Dr. Graily Hewitt, it appears to me that, as in the case of fistula, the source of the condition and of the drain must be removed, *i. e.* that the granular os must be healed, which is admirably, readily and easily effected by Dr. Emmet's operation. This having been done, the tonics, increased diet, sea-bathing, and change of scene can produce their effect, which usually remains permanent.

Dr. AUGUSTUS P. CLARKE, of Cambridge, Mass.—In listening to the reading of Prof. Graily Hewitt's admirable paper on the "Relations between Changes in the Tissues and Changes in the Shape of the Uterus," I am led to say that we are all placed under obligations to the author, whose ripe experience, careful thought and easy elucidation of the subject cannot fail to awake in us a closer study and reflection on the history and symptoms of cases that have passed from time to time into our own hands, and that have baffled skill and deserved, as we have often felt, to be ranked as enigmas.

In this line of inquiry I can readily recall cases occurring in my own practice that evidently have had their origin from the tissue changes referred to. One case in particular I would mention. A patient, aged seventeen years, had suffered from the presence of a marked anteflexion of a chronic character. A well-fitted Hodge pessary gave almost immediate relief to the more distressing symptoms. In establishing energy and tone in the tissues, however, a long period of careful treatment, both hygienic and therapeutic, was required, and several months elapsed before she was able to dispense with mechanical support. In this case there was a perversion of the secretion of the bladder, as evidenced by an abundance of white or mucous corpuscles found in the urine. This perverted product of secretion appeared to result not from an "inflammatory" condition of the bladder, but from an enfeebled or relaxed state, which, however, was more or less common to other tissues of the body.

I recall another case occurring in my practice, of a patient aged sixteen years, in which the version was produced or intensified by a sudden precipitation of the patient over an embankment, from a sleigh. In this case the anteflexion was unusually pronounced, and the uterine tissue was soft and flexible. I well remember a case of persistent hardening after flexion occurring in a multipara. The patient was lost sight of for some three years, and during that time the uterus became so hardened and flexed that it could not safely be restored. This case may be termed a menstrual subinvolution; the irregularly occurring menstrual periods, at a time when the uterine tissues were so deficient in tone, were undoubtedly the principal cause of this untoward result. No appreciable congestion nor inflammatory process could be demonstrated as contributing to the production of this peculiar condition.

Not long since the exceedingly attenuated walls of the uterine tissue at the seat of flexion was well shown by an autopsy. The patient had been under my care; married, but never had borne children. She had deficient circulation, and was of a nervous temperament and slenderly built. She was always considered inadequately nourished. The anteflexion during the last few years of her life gave no special inconvenience. On careful incision and inspection of the uterus at the autopsy no traces of inflammation nor of sclerosis of the tissues could be found. Nothing but an imperfectly developed condition and a marked degenerative change of the uterine tissues were observed.

Dr. DeWitt Clinton Wade, Holly, Mich., read a p

## DISPLACEMENTS OF THE UT

### DÉPLACEMENTS DE L'UTÉRU

### LAGEVERÄNDERUNGEN DES UTER

The propositions presented in this paper are based upon application of nearly 3000 uterine supporters, each instr constructed by myself to meet the requirements in individu This experience is undoubtedly unique, and it is capab views, irrespective of the impressions derived from other so

PROPOSITIONS.

1. Uterine displacement exists more frequently than an sexual apparatus, and very often commences at puberty.

2. In the normal subject, the axis of the uterus is at axis of the vagina, the cervix uteri not encroaching upon p

3. Deviations from the normal position of the uterus, encing adjacent structures, are capable of inducing, and and reflex discomforts that often amount to complete inval

4. The causes may include predisposition, inherited c ally include the application of mechanical influences, con timed muscular action, as in stair-climbing, lifting, overw perhaps most of all, of a narrowing and elongating the w these must be added the sequelæ of child-bearing.

5. The principal subjective symptoms that direct to phy ache, including the shoulders, neck and back of the he adjacent to the uterus, bearing-down, reflex nervous co impress the functions of the brain, eyes, heart, stomach, and a condition not easily technically described, having a extending from unamiability to insanity, and probably b "nervousness."

6. Physical examination is absolutely required to con who is familiar with the late advances in the study of the r organs.

7. Neglect to verify the probability of uterine displacem ment of the subjective symptoms as so many diseases, is t of the medical profession.

8. The relative frequency of uterine displacement, is ab the commencement of womanhood to old age.

9. Anteversion generally affects younger subjects than

10. A displacement for which I have seen no name in t where the angle of the axes of the uterus and vagina remai recedes toward the sacrum, even to a firm impingement of vaginal tissues. The term retrocession would, in my opi this form of displacement.

11. In retrocession, the normal axis of the vagina appro fundus, instead of meeting the uterus at its cervix.

12. It not infrequently occurs that the patient's subject to suggest that the cause of very pronounced reflex distu

locality, and in the case of young women this circumstance, almost universally, becomes a barrier to rational treatment, with a failure of recovery.

13. Pain in the back of the neck and head, aggravated by conditions capable of intensifying a displacement of the uterus, is a pathognomonic symptom.

14. That it is desirable to restore displaced pelvic viscera to normal positions, and that such restoration, if accomplished in an unobjectionable manner, is capable of terminating the local and reflex disorders depending upon the displacements, cannot have a shadow of a doubt.

15. It is unphilosophical to attempt to correct a displacement with medicine.

16. When the lacerations of childbirth cause uterine displacements, a restoration of the injured tissues, by plastic surgery, gives very gratifying results.

17. The treatment of the displacements of the uterus by methods of the text-books, has proved anything but successful.

18. The withdrawal of existing ætiological factors is doubtless desirable, but this alone cannot take the place of physical restorative efforts.

19. The temporizing expedient of attempting to retain the uterus in place by tamponing the vagina with cotton wool, in anticipation that in a few days the organ will permanently remain in a correct position, is not founded upon a reasonable theory, and is a failure in practice.

20. The mechanical treatment of uterine displacement by means of intra-vaginal appliances, is indicated in the great majority of cases, and the market is supplied with innumerable devices designed for this purpose.

21. It is almost the universal custom with those who attempt the mechanical treatment of uterine displacement, to do so with ready-made instruments.

22. On account of the great diversity of anatomical and pathological conditions existing with the female viscera, the mechanical treatment of the displacements of the uterus becomes much too complicated to permit a desirable degree of perfection to be reached in the use of the instruments at the command of the profession, and the attempt is quite likely to result in abandonment.

23. It is not possible to restore a displaced uterus to and maintain it in a normal position by means of a stem and ring, to encircle the cervix, which can be readily understood by recalling the normal relations of the vagina and uterus.

24. In retroversion of the uterus, the support is generally applied to the vagina behind the cervix, and in anteversion and retrocession, the place of contact for mechanical support is usually in front of the uterus.

25. On either side of the urethra, within the vagina, is a recess suitable for the reception of the lower end of the instrument in contact with the unyielding pubic arch.

26. The local and reflex symptoms are not proportionately relieved by the use of instruments inadequate to the complete establishment of a normal position of the uterus.

27. It is unusual to secure accuracy of adjustment by any method not involving the construction of an instrument for each individual.

28. After many experiments with different materials, I devised and adopted the plan, fifteen years ago, of shaping the instrument from No. 10 copper wire, and covering it with pure rubber tubing made for the purpose, with thick walls. The tools required, are a pair of bending pliers, a wire cutter and a flat file.

29. Any required device can thus be made, with as much delicacy in the shading of its contour as the indications in the case may demand.

30. There are two designs that I have devised, which I may show for illustration, that, in varying proportions, represent the principal requirements in the mechanical treatment of the displacements of the uterus.

31. It will be observed that provision is made for av urethra, bladder, cervix uteri and rectum, thus securing a discomfort.

32. Adhesions are not contraindications to replacemen method, commencing with an instrument that affords a li sues yield, exchanging for instruments of increased dimens is reached. I have seen most unpromising cases completel manner, of a dozen instruments.

33. It is never necessary to use a uterine repositor, for the uterus in good position will replace it in a better and s instrument.

34. One of the pleasant results of the successful treatn is its cosmetic effect; removing the otherwise incurable dis restoring a youthful and vivacious expression to one who and aging appearances associated with long suffering.

35. It is impracticable and uncalled for to discrimina against the rational treatment, without delay, of young local or reflex effects of a displacement of the uterus.

36. In a large proportion of cases the efficient restrain varying from six months to two years, is followed by a radi

37. With one who has been brought into close intim unyielding effort required to maintain a uterus that has be that permits a cessation of the sequelæ, no treatment will a the application of mechanical principles.

38. It is certainly true that, on account of the defectiv their disposal, many distinguished members of the pro patients who were suffering from displacement of the uter condition had been exaggerated, and its treatment was und

39. To close, I must say that he who follows the pla relieved from the sense that the displacements of the uteru of the profession, and will adopt a line of labor the resul refreshing and delightful.

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Dr. William Alexander, Liverpool, England, cont

## THE RESULTS OF THE EXPERIENCE GAINED YEARS OF THE OPERATION OF SHORTEN LIGAMENTS FOR UTERINE DISPL

### LES RÉSULTATS DE L'EXPÉRIENCE DE SIX ANS ET DE L'OPERATION DU RACCOURCISSEMENT DES LAIRES POUR LES DÉPLACEMENTS DE

### DIE RESULTATE DER IN SECHS UND EIN HALB JAHREN ER DER OPERATION FÜR VERKÜRZUNG DER RUNDEN LAGEVERÄNDERUNGEN DES UTER

On December 14th, 1881, the operation of shortening uterus, as a cure for displacement, was successfully perform living subject, at the Liverpool Workhouse Hospital. Since four times, and I append a table of eighty of these c

recently performed to allow of anything reliable being said about the therapeutic results of the operation upon their pelvic or uterine troubles.

When I consider that many had thought of this operation previously to my performing it; that some had even tried it upon the living, but had failed; that many have failed since with precedents to guide them, and that in some of these cases the patients have even died; I have much reason to congratulate myself on the success of my first cases, and that difficulties that confronted others at the very threshold of their labors were only met by me when my experience of the operation was such as to enable me to cope with them. To me, therefore, the operation has always been an easy, simple and safe one, and I no more expect a death from it than I expect a death from amputation of a finger. I can, however, sympathize with those whose initial difficulties have been greater than mine, and had I met with these difficulties earlier, I might have characterized the operation as difficult, dangerous and uncertain of success.

The experience of six and a half years has enabled me to improve upon my former methods of shortening the round ligaments, has accentuated the successes and shown the real disadvantages and dangers of the operation, and has pointed out how stumbling-blocks to its successful performance exist, both in the operator and the patient, and how these may best be removed. The after treatment of the cases is most important, and has become better by experience. The final anatomical and therapeutical results are now more certain, failures and successes of both kinds being now more easily separable from each other.

These headings I will now treat in succession, with as brief detail as possible:—

### OPERATIVE DETAILS.

Before operation, when the patient is anæsthetized, the uterus is to be replaced in its normal position, aided by the sound in retroflexion cases. If the operation is a simple retroversion, or a prolapse capable of relief by shortening the round ligament alone, or one in which the perineum is to be fortified at a subsequent operation, a well-fitting full-sized Hodge pessary only is to be introduced into the vagina.

When the case is one of prolapse, in which the perineal operation is to be done simultaneously with the round ligament operation, I merely push the uterus well into the pelvis and maintain it there by the finger of an assistant if necessary, until the ligaments are shortened; then I perform the perineal operation, and, of course, place *no* pessaries in the vagina.

When the case is one of retroflexion, a stem pessary is necessary to keep the uterus straight while the ligaments are uniting, so that the recoil power of the uterus may be destroyed. For this purpose a rigid galvanic stem is suitable, but lately I have adopted instead an ebonite stem, of fair thickness, supported on a broad metallic base of heavy metal. This stem actively counteracts and gradually destroys the elastic recoil of the uterus during the period of recumbency. Whenever a stem pessary is used, I always use a "Hodge" as well, although I think the "Hodge" may not be necessary with my "weighted stems." I have, however, not yet tried to do without it. The vagina has not to be interfered with again by the operator during the operation, nor, as a general rule, by his assistants, except to settle any doubtful point that may arise.

*Mode of Performing the Operation.*—Standing on the side opposite to that on which I am operating, the left fore-finger is placed on the pubic spine as a guide, and from this point an incision is made upward and outward, in the direction of the inguinal canal, for one and a half or more inches, according to the fatness of the patient. By subsequent incisions the wound is deepened until the aponeurosis of the external oblique muscle is exposed. The external oblique tendon, white and glistening, now comes into view. An experienced operator comes straight down upon the ring and ligament, but if these structures do not lie quite beneath the incision, the soft tissues can be

elastic abdominal belt. This completely relieves the feelin
either ligament, that is often felt, and altogether makes th

Such I consider the most perfect method of doing the op
and I hope I have given sufficient details. It must be see
the dead, several times, by beginners, before the requisite f

I append to this paper a table of eighty cases. Besides
and peritonitis, and four others have been done too recently
convalescing. One of these is a private and three are hospi
private cases I had no symptoms of danger in any case b
She was a very stout woman and had a severe prolapse—I
the end of five days after operation, going on quite well.
was restless, and had some morphia, which always disag
the bandages, opened up the wound, and when I came bac
pyæmic. I had to open up the wounds and destroy the effe
her life. I do not think this case can be cited to show that

I have divided my cases into hospital and private, becau
two classes of cases are quite different in many respects; t
chronic, have had treatment for many years, and all of them
troubles. During operation private patients live in a purer
do hospital cases. Antiseptics neutralize this advantage larg
less under control, are more nervous, fidgety, and less patie

*Private Operations.*—With three exceptions the private
flexion and its attendant troubles, the prolapse that often
displacement being only secondary and comparatively uni
one failed through opening up the wounds by the patient w
morphia; in the second a double hernia prevented the oper
third is now quite comfortable.

Of thirty-one retroflexions twenty are anatomical and the
anatomical successes, and the patients are much relieved; tw
and the rapeuticalfailures; and four failed in both respects.
the uterus drew the ligaments back before union took pla
attempt to do without a drainage tube ended in non-unio
duced non-union; and in the fourth the same cause probab
anatomical failures can now be completely avoided.

*Hospital Cases.*—Of my hospital cases, twenty-seven we
teen for prolapse; prolapse is a much more serious troubl
patients have to work hard for their living, than among t
rest and attention prevent the inconveniences as well as t
disease. All but one of these have been successful, as far
That one was malformed, and even when the fundus of th
pulled well up to the abdominal wall the cervix was protrud
gave her relief and comfort. In twelve of them I fortified th
require to wear light ring pessaries, that before operation w
the early stages of prolapse and have continued well withou
any perineal operation.

In my opinion the double operation is most effectual, ev
lapse, and the only mode of treatment for this disease worth
time.

The perineal operation that I perform does not differ mat
described by authors. The methods are, however, so num
whether I am performing one of my own or some other
perineum and lift up a large flap from the posterior wall of

on a level with the urethral opening. This flap is cut off; the sides of the vulva are stripped extensively of mucous membrane and brought well and firmly together by means of strong silkworm-gut sutures. Except that I tie any visibly spouting artery, I never mind oozing of blood, but wash out well and depend on the compression of the sutures to restrain the hemorrhage. I have never had to do one twice yet, and the operation only lasts about fifteen minutes. The whole operation for prolapse, ligamental and perineal, only occupies about half an hour, if we exclude the time occupied in giving chloroform and in subsequent dressing of patient.

Of twenty-seven retroflexions twenty-three were anatomical and therapeutical successes, three anatomical successes and partial therapeutical successes, one an anatomical success and a therapeutical failure, cured by removal of cystic ovaries. Many of my hospital patients, however, disappeared soon after operation and may not now be so well as when last seen, but I think most of them would have turned up again had anything gone wrong. This is, however, a valid objection to my hospital results that I cannot remove, as it is impossible to find these patients except they turn up again spontaneously, their habitat is so changeable. The fraction in the column of the table showing the time of operation and the time when the patient was last seen, will enable readers to form their own conclusions as to the permanency of the results.

The anatomical cure of a retroflexion by shortening the round ligament is a most certain result of the operation, fifty-four out of fifty-eight being successful, as far as I know.

The therapeutic results of the operation in these cases is more problematical. In private cases especially, it has been performed for epilepsy, hysteria, obscure pains, menstrual troubles, etc., troubles that years of treatment did not allay, or sometimes even mitigate. In a good many of such cases it has already rendered unnecessary the deprivative operation of removal of appendages, and in several cases inflamed appendages have recovered rapidly after the replacing of the uterus in a normal position. In three cases the appendages have been removed afterward; one of these died, one was relieved from the pain, and one has only been done recently, but has recovered from the operation.

### PREGNANCY.

Two of my retroflexions are pregnant at the present time and have not suffered as yet; one is at the third month and another at the eighth month. One has been pregnant twice without any inconvenience and without any return of the retroflexion for which the operation was performed. My private retroflexion cases have generally either been beyond the child-bearing age or before marriage, but the two that are now pregnant are private cases. The double pregnancy was a hospital case. As far as I know I can, without hesitation, say that the operation is no barrier to pregnancy or parturition.

### HERNIA.

In the performance of the operation of shortening the round ligaments the inguinal canal is disturbed and the peritoneum puckered up more or less into the internal inguinal ring. The tension of the ligaments probably also dilates to some extent the internal ring; the external ring is opened up as well, and there is now no doubt a slight tendency to hernia is actually produced by the operation. The tendency is not, however, very great, as it has occurred only a few times in my practice, where the operation has been performed in divers ways, and where the occurrence of hernia as an after-consequence was not for a long time specially guarded against. The adhesions that naturally take place in the canal and at the external ring, after operation, mostly destroy the tendency to hernia that the manipulations produce. Since I became aware of the tendency to hernia I have more effectually guarded against it by the closure of the external abdominal ring by means of buried sutures, and in none of these has any

tendency to the occurrence of hernia yet appeared. It sho
such a tendency has always to be reckoned with. Plenty o
and the wearing of an abdominal belt for some time, are ot
the tendency to hernia.

PELVIC ADHESIONS, PROLAPSED OVARIES, THICKENE

Do these conditions contraindicate the operation whe
flexions? They render the anatomical success of the operat
frequently as I once supposed. I remember one case (N
adhesions seemed to me at the time to spoil the operation. I
as far as possible, and, of course, expected a failure, the uter
diately after the operation) half retroverted. To my agreeab
out a success, as, on examination, some months after, I found
perhaps, as natural, but still in fair position, and, what is bett
Many of my private cases had adhesions, and some of them
with these I have been remarkably successful. Many prol
are now well up and have ceased to be painful, or nothing
formerly were. In all these cases the ligaments must be well
well supported with "Hodge" and "stem" pessaries du
The constipation that is a prominent symptom of all these
been much relieved by the operation, through the uterus
from the rectum.

CASES IN WHICH THE OPERATION SHOULD BE

1. *For Retroflexion.*—In *paupers* who come into hospital
where time is not of much moment, and where a radical cure
in the end, I always operate as a matter of routine, if the p
treatment in my hands. The result has justified the course
all the pauper cases of retroflexion have been, as far as I know
relieved, and have not troubled us again. This is in pleasant
such cases were constantly readmitted.

In the wealthy and leisure class of women, where pess
or partial relief, and where intervals of rest are required to
use of these instruments; where the constant attention of a
intolerable and the patient is a chronic invalid; where pessa
patients are bed-ridden; and where neurotic symptoms a
depend on the flexion, and the patient's health is failing, I
operation, if an examination leads me to think the operati
successful.

The patient, in such cases, sometimes asks if this operati
toms. To this I reply: "It will almost certainly put your
again, but how rapidly the symptoms that you complain of
cannot say. It will probably take some time. I cannot pro
them all, but I hope it will, and may prevent the perfor
operation."

I have no doubt, from my hospital experience, that i
performed earlier in my private cases, years of suffering wou
more immediate relief would have followed the operation.

In the middle class, where women have daily duties t
perhaps greater than in either of the other two classes, and t
a month free from household cares is a serious obstacle t
operation. Here pessaries will always be a greater req
would advise it in the same cases as the other two classes, y

probably be performed after the patient is frequently placed *hors de combat* by her infirmities. This is more a question for special women's hospitals, to which such patients resort. I believe if this operation were done earlier, in such cases, the removal of the appendages would less frequently have to be resorted to.

2. *For Prolapse.*—Among the upper classes this operation is rarely required with the same absolute necessity as among the lower and working classes. Among individuals of leisure it does not occur so readily, and its distressing effects are not so much in evidence where rest and carriages are at the disposal of the sufferer. A light pessary often enables them to perform all their duties with comfort, and during the child-bearing period the double operation would, with them, always be contra-indicated. When the child-bearing period has ceased and pessaries are irksome, irritating, and require frequent attention, then I would strongly recommend the double operation. The comfort given by it is undoubted, and the look of satisfaction on some of my patients' faces, when the effects of the operation are referred to, is pleasant to witness.

Among the lower and working classes the operation is a necessity as well as a great boon. It is applicable to the worst cases, provided the patient is able to bear the effects of the operation, and if the patient is fairly healthy, both operations can be performed at the same time. It is a great advantage to perform the operations consecutively, as the patient has all over at once, and can look forward to convalescence with pleasure. It is different when another operation is looming in the distance. In child-bearing women, the perineal operation would naturally always be avoided, if possible but in some the troubles are so great, and pessaries so ineffectual, that I have performed the operation in spite of the possible chance of pregnancy. It does not follow that the effects of the perineal operation will be all destroyed by pregnancy, and if a rupture occurred during parturition and were well stitched up by the medical attendant, the recurrence of the prolapse might be prevented. I have no cases to offer in support of my view, as none of these cases have, to my knowledge, yet become pregnant. I have much more pleasure in doing my operations for prolapse, than in operating for retroflexions. In the former case I am so certain of a therapeutic success as well as an anatomical success. In retroflexion cases I can only count on an anatomical success, and it is not the *displacement* that troubles the patient, but something else dependent upon, or supposed to be dependent on the displacement, but which either does not depend upon it or can exist independently of the displacement for a time. In prolapse, the relief is decided and demonstrable; in retroflexion, the relief, though sometimes as decided, is often tardy, gradual and not so patent to the patient or her friends. Slow changes have to take place in the uterus and its appendages; changes that are, I believe, always beneficial and never injurious; changes that tend toward health, and not toward disease; and through these slow changes a complete recovery gradually takes place. (Nos. 8, 13, 24, 19, are examples of this gradual change, among my private cases.)

In operating for retroflexion we must be prepared to find the result a therapeutic failure, owing to the dependence of the symptoms on some other cause, in spite of the most careful examinations and considerations before operation. Or the whole nervous system of the patient may be demoralized, and years of patient struggling back to health may be necessary before health can be gained and vicious habits eradicated. All these things I explain to my patients in retroflexion cases, giving my opinion as to the condition of affairs in each particular case, and promising only one thing, an anatomical success, where the uterus will be put in a straight and normal position, and the ovaries, tubes and broad ligaments raised from their abnormal position. This is the surgical mission of the operation in retroflexion, and this it can perform well when properly done. Beyond this it often cures, generally benefits, is not deprivative, and never aggravates disease.

TABLE OF THE RESULTS OF SHORTENING THE ROUND LIGAMENTS ON THIRTY-FOUR PRIVATE PATIENTS UPON WHOM THE OPERATION WAS PERFORMED.

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 1 | Mrs. L. | 28 | Retroversion and prolapse; pain and dragging; pessary intolerable. | May 1, 1882. | April 20, 1887. | Nil. | Position perfect. | Has been quite well till February last, when she had a hæmatocele after menstruation; is now quite well again; operation a therapeutic success. |
| 2 | Mrs. C'l. | 30 | Acute retroflexion; pelvic pains and occasional violent general neuralgic attacks; prolonged useless previous treatment. | Feb'y 13, 1882. | May 13, 1887. | Almost nil. | Uterus quite straight and a little anteverted. | Neuralgic attacks unchanged; very hysterical; discontented and flighty; no evidence of disease of appendages. |
| 3 | Mrs. Ca. | 38 | Epileptiform attacks; acute retroflexion and pelvic pains; pessary aggravated them. | July 4, 1883. | Summer of 1885. | Patient restless; wounds suppurated; uterus resumed on third day. | Flexion as before; version remedied. | A therapeutic failure and partly an anatomical failure. |
| 4 | Mrs. Wm. | 26 | Prolapse and retroversion; pelvic pains; sickness; anæmia. | Sept. 6, 1883. | Feb'y 5, 1886. | Almost nil. | Position perfect, as ascertained at operation, as well as per vaginam. | No benefit from operation; got thinner and thinner; vomiting incessant; appendages removed; cystic; died on third day, from continuation of vomiting; no post-mortem. |
| 5 | Miss C. | 24 | Retroflexion; great pain; dilated bladder; incontinence | Nov. 28, 1883. | May 7, 1887. | Some suppuration; no fever. | Position excellent; bladder still large, but less in | Still pain, but much less; no incontinence; wears a light pessary to give support, as she stands much; health |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 10 | Nurse in Soho. | | Retroflexion and prolapse; much pain; very neuralgic. | March 12, 1885. | April, 1887. | Very little. | Dr. Heywood Smith says uterus in fair position. | Pain unrelieved; removed appendages in April, '87; neuroma on right genito-crural nerve. |
| 11 | Mrs. Ki. | 40 | Retroflexion; pessary useless; pains, etc. | March 12, 1885. | May, 1886. | Nil, I believe. | Some doubt about position. | *Two* medical men said all right; *one* said tilted *slightly* backward; pains still in pelvis; lost sight of since. |
| 12 | Mrs. Ab. | 40 | Retroversion and prolapse; pains; cannot wear a pessary. | Nov. 14, 1885. | July, 1887. | None. | Position excellent. | All symptoms relieved; heard that she was pregnant some months ago and quite well. |
| 13 | Mrs. Se. | 28 | Retroflexion; pain; bedridden for some years; constipation. | October 13, 1885. | January, 1887. | Nil. | Position normal. | Can walk about comfortably; health restored; patient very grateful for results. |
| 14 | Mrs. Sh. | 50 | Extreme prolapse in a *very* stout lady; unable to go about. | Sept. 17, 1885. | June, 1886. | Profuse suppuration. | No benefit. | Patient, not quite sane, when under morphia, opened up wounds and brought on pyæmia; recovered, but ligaments did not unite. |
| 15 | Miss Ho. | 19 | Acute retroflexion; no cervix; menorrhagia, pain, etc.; pessary no use; prolapsed ovary and adhesions. | Jan'y 22, 1886. | May 1, 1887. | Tried to do without drainage tube; suppuration occurred. | Recoiled after a time. | Mistake in not using drainage tubes, but thought to get union by first intention; patient relieved for a time; now in statu quo. |
| 16 | Miss Ca. | 24 | Acute retroflexion; prolapsed ovary; pain in back, and inability to walk; pessary only partially useful. | March 14, 1886. | May 20, 1887. | Nil. | In excellent position. | Pain in back still in one spot in spine; dragging gone; when last heard of was getting a Prathrœ Smith's Spinal Support. |
| 17 | Mrs. Ma. | 24 | Great dysmenorrhœa; bedridden; anæmic: acute retroflexion and prolapse; pain and dragging. | March 1, 1886. | March, 1887. | Nil. | Excellent position. | Health and strength much improved; some menstrual troubles still, but tolerable. |
| 18 | Mrs. P. | 36 | Acute retroflexion; dragging pains; weariness; dysmenorrhœa and leucorrhœa; large, heavy uterus. | June 25, 1886. | May 31, 1887. | Slight. | Excellent position. | All dragging pains gone; slight leucorrhœa, but feels quite well; a sinus remained in one round ligament for nearly a year; it gave no trouble. |
| 19 | Miss Oc. | 26 | Acute retroflexion; prolapse; bedridden; dysmenorrhœa; anæmic; sufferer for eleven years; neurotic; prolapsed right ovary; tender. | May 19, 1886. | May 1, 1887. | Nil. | Excellent position; ovary out of reach. | Can now engage in all the duties of life; some pain still, occasionally, in pelvis, but general health improving; ovary quiescent. |
| 20 | Mrs. S. | 45 | Prolapse and retroflexion; almost unable to walk; used bath-chair; neuralgic; uterus small. | March 3, 1886. | May 19, 1887. | Slight suppuration; no fever. | Excellent position. | Left ligament fatty, would not pull out; right, strong; can now walk about; looks much stronger; wears a light pessary, a precaution against prolapse. |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when Last Seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 21 | Mrs. Wa. | 38 | Acute retroflexion, and left appendage thickening; bedridden; menstrual and bowel troubles; anæmic. | June 14, 1886. | May, 1887. | Nil. | Excellent position. | Can walk about much better; health being slowly restored. |
| 22 | Mrs. Bu. | 40 | Acute retroflexion; pains; floodings; dragging; almost bedridden. | June 2, 1886. | December, 1886. | Nil. | Excellent position. | Much improved in every way; no complaints since. |
| 23 | Miss Pr. | 21 | Complete prolapse of uterus and vaginal wall and rectum; dragging and discomfort. | Sept. 1, 1886. | May 1, 1887. | Nil. | Excellent position; no prolapse. | Perineum fortified and round ligaments shortened; some tendency to hernia; requests a truss; very lax abdominal walls. |
| 24 | Miss Dr. | 24 | Acute retroflexion; ovarian neuralgia; hysteria; pessary gave no relief. | Nov. 9, 1886. | May 30, 1887. | Nil. | Excellent position. | Has attacks of hysteria and ovarian tenderness. |
| 25 | Mrs. Si. | 40 | Acute retroflexion; pain; dragging; constipation; ovaries adherent to rectum; dysmenorrhœa. | Nov. 19, 1886. | May 31, 1887. | Suppuration slight; some sloughing of ligaments. | Uterus straight, but retroverted slightly and to right. | Bowels now natural, no dragging or pain except after much walking. |
| | | | Acute retroflexion; pro- ful ovary; inability inary trou- | Nov. 23, 1886. | May 14, 1887. | Nil; stitch irritated. | Position excellent; ovary keeps up. | One ligament slack; had to reopen wound and pull it out further on that side; some suppuration; a sinus still remains; urinary troubles, but gradually becoming less. |
| | | | | | January, 1887. | Nil. | Excellent. | Much improved in every way, some back to duties. |
| | | | | | Nil. | | Excellent. | Much improved; can walk about an attend to duties; gratitude for benef very great. |
| | | | | | | | ent position. | Quite relieved; can walk long d tances. |
| | | | | | | | | ts better; neuralgia less; ts well; ovary we 1887. |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 32 | Miss Be. | 27 | Acute retroflexion; adhesion; prolapsed ovary; pain; pessary intolerable. | March 7, 1887. | July 15, 1887. | Nil. | Slight retroversion, but well formed. | Much better every way; scarcely any pain, and very glad operation was performed. |
| 33 | Mrs. Bl. | 42 | Prolapse; retroversion; dragging pain; neuralgia; kept room twelve months. | April 25, 1887. | August 1, 1887. | Nil; perineum at same time. | Position excellent. | Becoming strong and well; all pain and dragging lost, so far. |
| 34 | Mrs. P. | 55 | Prolapse extreme; ulcerated womb and vaginal wall; cannot walk. | October 15, 1885. | May, 1886. | Nil; perineum at same time. | In fair position. | Double hernia found at operation; round ligaments would not run to usual distance; success only partial; perineum bulges and requires a perineal support. |

TABLE OF THE RESULTS OF SHORTENING THE ROUND LIGAMENTS ON FORTY-SIX HOSPITAL PATIENTS UPON WHOM THE OPERATION WAS PERFORMED.

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 1 | Eliz. C. | 38 | Prolapse. | Dec. 14, 1881. | May, 1883. | Slight. | Excellent. | Comfortable; cystocele when last seen. |
| 2 | Bridget R. | 45 | Prolapse. | Feb. 1, 1882. | July 30, 1887. | Fair amount. | Excellent (cystocele cured by perineal operation). | No trouble from the uterine disease. |
| 3 | Ellen T. | 28 | Prolapse. | January 4, 1882. | July, 1883. | Slight. | Excellent. | Quite well when last heard of. |
| 4 | Eliz. D. | 30 | Retroflexion; painful menstruation; epilepsy. | Dec. 21, 1881. | May 31, 1887. | Nil. | Excellent position. | Only one ligament shortened; no complaint of pelvic trouble; epileptic attacks much the same. |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 5 | Mary S. B. | 24 | Retroflexion; epilepsy. | March 6, 1882. | May, 1885. | Nil. | Excellent, even after childbearing twice. | Quite relieved from fits up to 1885; not seen since; a small left inguinal hernia; truss ordered. |
| 6 | Anne B. | 34 | Prolapse; pain and pelvic uneasiness. | May 24, 1882. | May, 1883. | Almost nil. | Excellent. | Complete relief when last seen. |
| 7 | Minnie H. | 19 | Retroflexion; pains, dragging, etc. | Sept. 9, 1882. | Nov. 23, 1882. | Slight. | In good position. | Symptoms relieved; patient not seen since. |
| 8 | Anne V. | 32 | Retroflexions; adhesions; discharge. | Sept. 2, 1882. | August, 1883. | One ligament; nil. | Not quite straight, but almost so. | Quite comfortable ever since operation. |
| 9 | Mrs. W. | 40 | Prolapse; pain in back; dragging. | May 2, 1883. | Oct. 29, 1883. | Nil. | Well up and slightly anteverted. | Back quite well; no dragging. |
| 10 | Cath. D. | 24 | Retroflexion; dysmenorrhœa and endometritis. | March 21, 1883. | May 29, 1883. | Slight. | In good position. | Symptoms gone when examined at date mentioned; not since heard of. |
| 11 | Anne H. | 17 | Retroversion; leucorrhœa; urinary incontinence. | January 3, 1883. | March 3, 1883. | Slight. | Good position a month after operation. | Went to Chester on March 3, 1883, quite well; no report since, although address written to. |
| 12 | Mary B. | 26 | Pelvic pain; some retroflexion and prolapse. | Dec. 13, 1882. | January 1, 1883. | Slight. | Uterus in good position. | When discharged, well; not heard of since. |
| 13 | Sarah D. | 28 | Leucorrhœa; endometritis some retroflexion and prolapse. | October 10, 1883. | Nov. 3, 1883. | Slight. | Well in position. | Went out of hospital quite comfortable; not heard of since. |
| 14 | Mary R. | 39 | Pain in back; vomiting; leucorrhœa retroversion and prolapse. | August 22, 1883. | July 27, 1887. | Almost nil. | Well in position. | Has felt quite well ever since operation; has now turned up with a cut lip. |
| 15 | Ellen S. | 20 | Prolapse and retroversion [illegible] | Sept. 12, 1883. | October 29, 1883. | Nil. | Well in position. | No discharge and feeling well. |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 22 | Mrs. R. | 29 | Retroflexion; pains; discharge. | June 18, 1884. | June, 1886. | Nil. | Excellent position. | No troubles referable to uterus; tertiary syphilis developed; nodes, caries, etc. |
| 23 | Agnes F. | 24 | Epilepsy; retroflexion; dysmennorrhœa; mania. | Dec. 18, 1884 | July 20, 1887. | Nil. | Excellent position. | No menstrual troubles; epilepsy as before; not so maniacal. |
| 24 | Eliz. K. | 30 | Dragging pains; discharge; dysmenorrhœa; retroflexion. | Sept. 6, 1883. | October 6, 1883. | Some suppuration. | In good position. | Can find no record of her after this date. |
| 25 | Mary A. R. | 30 | Extreme prolapse; pessary useless. | Sept. 4, 1884. | March, 1887. | Nil. | In good position. | Extreme cystocele and rectocele; a light ring keeps them up; refused lower operation, as she is now quite comfortable. |
| 26 | Mgt. C. | 37 | Extreme prolapse; pains; pessary useless. | June 10, 1885. | May, 1886. | Nil. | In good position (perineum fortified). | Heard several times that she was well; a very bad case and an excellent result. |
| 27 | Georgiana A. | 30 | Retroflexion; pains; thickened right appendages. | July 15, 1885. | July 30, 1887. | Nil. | Excellent position. | Feels quite well; a small left inguinal hernia; came for truss; appendages cannot be felt. |
| 28 | Rebecca M. | 40 | Extreme prolapse. | Sept. 2, 1885. | January 1, 1886. | Nil. | Excellent position (perineum fortified). | Quite well every way; not heard of since. |
| 29 | Jane S. | 26 | Prolapse; extremely short vagina. | Sept. 2, 1885. | January 4, 1887. | Nil. | Prolapse as bad as ever, although perineum fortified (malformed organs). | Pulled up second time until could feel fundus uteri and ovaries beneath abdominal wall; yet uterine neck protruded at os. |
| 30 | Mary B. | 21 | Complete prolapse; uterus hanging between thighs. | Sept. 28, 1885. | About a year after. | Nil. | In good condition (perineum fortified). | Dr. McClelland has seen her several times; no word of any prolapse or symptoms. |
| 31 | Anne S. | 22 | Complete retroflexion pains and discharge. | January 20, 1886. | | Nil. | In excellent position. | Was quite well when last heard of. |
| 32 | Anne D. | 23 | Retroflexion; pains extreme; discharge; dysmenorrhœa. | March 10, 1886. | April 10, 1886. | Nil. | In excellent position. | Insisted on going out, as she felt quite well; not heard of since. |
| 33 | Eliz. S. | 31 | Retroversion; amenorrhœa; pains in back, etc. | June 11, 1886. | July 11, 1887. | Almost nil. | Excellent position. | Quite well menstruates but scantily still. |
| 34 | Mary H. | 25 | Retroflexion; pain; discharge weak chest. | July 7, 1886. | Died of phthisis Sept. 26, 1886. | Almost nil. | Excellent position; plenty of room for bladder; ligaments cicatrized to ring and strong. | Felt well while she walked about, but could not walk much; no suspicion that phthisis was pyæmic; uterine discharge ceased after operation. |
| 35 | Mary Sh. | 25 | Prolapse and retroflexion; pains; leucorrhœa. | March 3, 1886. | Sept. 25, 1886. | Nil. | In good position. | Feels very well; not seen since. |
| 36 | Jane R. | 41 | Retroflexion and prolapse; pessary failed; dragging and ulceration. | August 4, 1886. | August 1, 1887. | Almost nil. | In good position. | Is a scourer in workhouse; feels quite well. |

pulled by retractors, upward, downward, inward or outward, u
are exposed. Sometimes the external ring is small or almost i
of the pubis is then the only guide, and the canal must be op

This first stage, of finding the ring, appears to be very simp
many failures have occurred. Half-way through the fatty t
subjects, a thick aponeurosis is met with that simulates in a
of the external oblique. Here many operators stop and search
aperture that looks like a ring. Some find out their mistake w
the true aponeurosis accidentally comes into view. This is
and it would be safe, generally speaking, to lay it down as a ru
ture only *resembles* the external oblique tendon, it may be as
tendon, and deepen the wound until it is undoubtedly reache
deep only becomes possible where the external ring is large an
lies directly over it. Then the ring may be entered withou
oblique muscle having been seen, and the end of the ligame
unrecognized. To avoid this I always go down to the aponeu
the wound and search in the first instance for the aponeurosis
abdominal ring. Then the ring can be exposed in its natu
ligament protruding in company with some fatty tissue vesse
the ring is large or small, a bulging always occurs over it, ver

In performing the first stage of the operation, no teasing o
The incisions should be clean cuts. The edges of the wound a
out displacement of the site of the wound. Unless this is
commenced over the canal by the first incision may, by unsl
the saphenous opening or half way up to the umbilicus b
reached. Retraction is intended only to evert the lips of the w
incisions may deepen it under the guidance of the eye, wher
by being pulled out of the way instead of being cut and tied
never any *serious* bleeding, and as a rule there is none. It is
vessel, so as to secure as far as possible union by the first inter

*Second Stage of the Operation.*—The external abdominal ri
the wound is kept open by retractors, and the thin fascia th
the canal cut through with the point of a knife, in the direc
ring. The ligament now bulges out and can be seized at on
vascular-looking structure, of varying degrees of thickness, h
it superficially, and some vessels and fat behind.

Its termination spreads out into filaments that are lost in
tissues around, while laterally it has some adhesions to th
The lateral adhesions vary much in number and firmness, and
ligaments are well isolated before being pulled upon. If all t
are seized upon *en masse* and pulled, many adhesions have to
with other structures. The nerve resists at once, and this I n
have made the ligaments tense. I do the greater part of the w
I find them more reliable than forceps. I seize the tissues o
canal and that have been raised out of it with a pair of dissec
finger and thumb of the left hand, and worm my fore-finger be
all the constituents of the canal on the tip of the fore-finger
the ligament seen and isolated by the fore-finger thrust be
being separated from it by a probe or director. A little gentl
ligament to run freely, thickening as it emerges and becom
stronger. In all cases I now pull the ligaments out to their f
trouble myself as to whether the peritoneum is adhered to it o

position of the uterus may be. No harm has ever resulted from over-shortening. About four inches is the usual distance. If a finger is now passed into the vagina the uterus will be erect and always in the middle line, the ovary and tubes well pulled forward toward the opening of the external abdominal ring.

I now slacken the tension a *little*, to give the ligament "play," and stitch it, by two silkworm-gut sutures of medium thickness, to both pillars of the ring. The needle is first passed through one pillar, then through the ligament, and next through the other pillar. The pillars of the ring are now just brought together. No force is used in tying the knots, so as to avoid strangulation of the ligament. These buried sutures are cut off close. The slack of the ligament now hangs loosely out of the inner part of the ring. It is lifted up, pulled tense and a small drainage tube inserted beneath it into the inguinal for about half an inch to an inch. The end of the drainage tube protrudes from the inner angle of the wound. The wound is now well washed out with perchloride of mercury lotion (1-1000) and the retractors withdrawn, allowing the edges of the skin wound to fall together, with the slack of the ligament hanging out. This slack is now examined and the frayed part removed, the vessel being tied with fine catgut. The remainder is next stitched in the wound by means of the two superficial sutures of silkworm gut, that also close the wound. A small safety pin is then passed through the ends of the drainage tube, and the wound covered with gauze or iodoform until the opposite ligament is shortened. The wounds are then dusted with iodoform and covered with pads of absorbent cotton-wool, strapped firmly on by strips of soap strapping, and the whole dressing finally maintained in position by a flannel binder. Many other kinds of dressing would, of course, do, but I am describing only my own routine.

The patient is now placed in bed in a recumbent position, with her knees over a pillow and her diet is limited for two or three days to milk, bread and milk, beef tea, soups, tea and coffee, etc., varied according to the taste of the patient. The urine is passed naturally, if possible, within a reasonable time, but the catheter is to be used before much accumulation occurs. The wounds are dressed on the second day, to cleanse them from any effused blood, and again on the fifth or sixth day, to remove the drainage tube. Then if union by the first intention is taking place, they are to be dressed on the thirteenth day, to remove the superficial stitches, and after that covered up for another week. When suppuration occurs, and is discovered on the fifth day, it is best to dress frequently and to obviate any tension by removal of the superficial stitches and frequent washings with antiseptics.

The bowels should be moved at the end of a week or ten days, unless distress referable to constipation is experienced. Five grains of calomel at night, followed next morning by a starch or soap enema is my favorite aperient, and generally produces a liquid movement without straining; should the stem pessary irritate, the nurse is directed to syringe the vagina daily with warm perchloride lotion or weak Condy's fluid, or a weak iodine lotion; but it never does irritate seriously. The stem may be removed at the end of the third week, when the wounds are soundly healed. However, if it does not irritate I keep it in for another week, while the patient is sitting about, only removing it when she begins to walk. When the flexion of the uterus has been excessive I often keep it in longer. The Hodge I remove at the same time I do the stem. The patient is now warned to go about quietly and cautiously for one or two weeks longer, and to be careful of herself for six months. I warn, because I found that at the end of three weeks many patients think they are quite well and that they can stand strenuous exertion. Now, no structure unites quite firmly in three weeks, and retraction or contraction may take place after that time; that is, the cicatrix may get weaker or strong. By rest strength is promoted, by exercise weakness.

When the patient is allowed to go about, at the end of the month, I now order an

elastic abdominal belt. This completely relieves the feeling either ligament, that is often felt, and altogether makes the

Such I consider the most perfect method of doing the op and I hope I have given sufficient details. It must be seen the dead, several times, by beginners, before the requisite fa

I append to this paper a table of eighty cases. Besides and peritonitis, and four others have been done too recently t convalescing. One of these is a private and three are hospit private cases I had no symptoms of danger in any case b She was a very stout woman and had a severe prolapse—I l the end of five days after operation, going on quite well. T was restless, and had some morphia, which always disag the bandages, opened up the wound, and when I came back pyæmic. I had to open up the wounds and destroy the effec her life. I do not think this case can be cited to show that

I have divided my cases into hospital and private, becau two classes of cases are quite different in many respects; th chronic, have had treatment for many years, and all of them troubles. During operation private patients live in a purer a do hospital cases. Antiseptics neutralize this advantage larg less under control, are more nervous, fidgety, and less patien

*Private Operations.*—With three exceptions the private flexion and its attendant troubles, the prolapse that often displacement being only secondary and comparatively uni one failed through opening up the wounds by the patient w morphia; in the second a double hernia prevented the opera third is now quite comfortable.

Of thirty-one retroflexions twenty are anatomical and ther anatomical successes, and the patients are much relieved; tw and the rapeuticalfailures; and four failed in both respects. O the uterus drew the ligaments back before union took plac attempt to do without a drainage tube ended in non-union duced non-union; and in the fourth the same cause probab anatomical failures can now be completely avoided.

*Hospital Cases.*—Of my hospital cases, twenty-seven were teen for prolapse; prolapse is a much more serious trouble patients have to work hard for their living, than among th rest and attention prevent the inconveniences as well as th disease. All but one of these have been successful, as far a That one was malformed, and even when the fundus of the pulled well up to the abdominal wall the cervix was protrudi gave her relief and comfort. In twelve of them I fortified the require to wear light ring pessaries, that before operation w the early stages of prolapse and have continued well withou any perineal operation.

In my opinion the double operation is most effectual, eve lapse, and the only mode of treatment for this disease worth time.

The perineal operation that I perform does not differ mat described by authors. The methods are, however, so num whether I am performing one of my own or some other perineum and lift up a large flap from the posterior wall of t

on a level with the urethral opening. This flap is cut off; the sides of the vulva are stripped extensively of mucous membrane and brought well and firmly together by means of strong silkworm-gut sutures. Except that I tie any visibly spouting artery, I never mind oozing of blood, but wash out well and depend on the compression of the sutures to restrain the hemorrhage. I have never had to do one twice yet, and the operation only lasts about fifteen minutes. The whole operation for prolapse, ligamental and perineal, only occupies about half an hour, if we exclude the time occupied in giving chloroform and in subsequent dressing of patient.

Of twenty-seven retroflexions twenty-three were anatomical and therapeutical successes, three anatomical successes and partial therapeutical successes, one an anatomical success and a therapeutical failure, cured by removal of cystic ovaries. Many of my hospital patients, however, disappeared soon after operation and may not now be so well as when last seen, but I think most of them would have turned up again had anything gone wrong. This is, however, a valid objection to my hospital results that I cannot remove, as it is impossible to find these patients except they turn up again spontaneously, their habitat is so changeable. The fraction in the column of the table showing the time of operation and the time when the patient was last seen, will enable readers to form their own conclusions as to the permanency of the results.

The anatomical cure of a retroflexion by shortening the round ligament is a most certain result of the operation, fifty-four out of fifty-eight being successful, as far as I know.

The therapeutic results of the operation in these cases is more problematical. In private cases especially, it has been performed for epilepsy, hysteria, obscure pains, menstrual troubles, etc., troubles that years of treatment did not allay, or sometimes even mitigate. In a good many of such cases it has already rendered unnecessary the deprivative operation of removal of appendages, and in several cases inflamed appendages have recovered rapidly after the replacing of the uterus in a normal position. In three cases the appendages have been removed afterward; one of these died, one was relieved from the pain, and one has only been done recently, but has recovered from the operation.

### PREGNANCY.

Two of my retroflexions are pregnant at the present time and have not suffered as yet; one is at the third month and another at the eighth month. One has been pregnant twice without any inconvenience and without any return of the retroflexion for which the operation was performed. My private retroflexion cases have generally either been beyond the child-bearing age or before marriage, but the two that are now pregnant are private cases. The double pregnancy was a hospital case. As far as I know I can, without hesitation, say that the operation is no barrier to pregnancy or parturition.

### HERNIA.

In the performance of the operation of shortening the round ligaments the inguinal canal is disturbed and the peritoneum puckered up more or less into the internal inguinal ring. The tension of the ligaments probably also dilates to some extent the internal ring; the external ring is opened up as well, and there is now no doubt a slight tendency to hernia is actually produced by the operation. The tendency is not, however, very great, as it has occurred only a few times in my practice, where the operation has been performed in divers ways, and where the occurrence of hernia as an after-consequence was not for a long time specially guarded against. The adhesions that naturally take place in the canal and at the external ring, after operation, mostly destroy the tendency to hernia that the manipulations produce. Since I became aware of the tendency to hernia I have more effectually guarded against it by the closure of the external abdominal ring by means of buried sutures, and in none of these has any

tendency to the occurrence of hernia yet appeared. It sho such a tendency has always to be reckoned with. Plenty o and the wearing of an abdominal belt for some time, are oth the tendency to hernia.

PELVIC ADHESIONS, PROLAPSED OVARIES, THICKENED

Do these conditions contraindicate the operation when flexions? They render the anatomical success of the operati frequently as I once supposed. I remember one case (No adhesions seemed to me at the time to spoil the operation. I as far as possible, and, of course, expected a failure, the uteru diately after the operation) half retroverted. To my agreeabl out a success, as, on examination, some months after, I found i perhaps, as natural, but still in fair position, and, what is bett Many of my private cases had adhesions, and some of them with these I have been remarkably successful. Many prola are now well up and have ceased to be painful, or nothing formerly were. In all these cases the ligaments must be well well supported with "Hodge" and "stem" pessaries du The constipation that is a prominent symptom of all these been much relieved by the operation, through the uterus a from the rectum.

CASES IN WHICH THE OPERATION SHOULD BE

1. *For Retroflexion.*—In *paupers* who come into hospitals where time is not of much moment, and where a radical cure in the end, I always operate as a matter of routine, if the pa treatment in my hands. The result has justified the course all the pauper cases of retroflexion have been, as far as I know relieved, and have not troubled us again. This is in pleasant such cases were constantly readmitted.

In the wealthy and leisure class of women, where pess or partial relief, and where intervals of rest are required to use of these instruments; where the constant attention of a intolerable and the patient is a chronic invalid; where pessa patients are bed-ridden; and where neurotic symptoms a depend on the flexion, and the patient's health is failing, I operation, if an examination leads me to think the operatio successful.

The patient, in such cases, sometimes asks if this operatio toms. To this I reply: "It will almost certainly put your w again, but how rapidly the symptoms that you complain of w cannot say. It will probably take some time. I cannot pron them all, but I hope it will, and may prevent the perfor operation."

I have no doubt, from my hospital experience, that if performed earlier in my private cases, years of suffering woul more immediate relief would have followed the operation.

In the middle class, where women have daily duties to perhaps greater than in either of the other two classes, and t a month free from household cares is a serious obstacle to operation. Here pessaries will always be a greater requ would advise it in the same cases as the other two classes, ye

probably be performed after the patient is frequently placed *hors de combat* by her infirmities. This is more a question for special women's hospitals, to which such patients resort. I believe if this operation were done earlier, in such cases, the removal of the appendages would less frequently have to be resorted to.

2. *For Prolapse.*—Among the upper classes this operation is rarely required with the same absolute necessity as among the lower and working classes. Among individuals of leisure it does not occur so readily, and its distressing effects are not so much in evidence where rest and carriages are at the disposal of the sufferer. A light pessary often enables them to perform all their duties with comfort, and during the child-bearing period the double operation would, with them, always be contra-indicated. When the child-bearing period has ceased and pessaries are irksome, irritating, and require frequent attention, then I would strongly recommend the double operation. The comfort given by it is undoubted, and the look of satisfaction on some of my patients' faces, when the effects of the operation are referred to, is pleasant to witness.

Among the lower and working classes the operation is a necessity as well as a great boon. It is applicable to the worst cases, provided the patient is able to bear the effects of the operation, and if the patient is fairly healthy, both operations can be performed at the same time. It is a great advantage to perform the operations consecutively, as the patient has all over at once, and can look forward to convalescence with pleasure. It is different when another operation is looming in the distance. In child-bearing women, the perineal operation would naturally always be avoided, if possible but in some the troubles are so great, and pessaries so ineffectual, that I have performed the operation in spite of the possible chance of pregnancy. It does not follow that the effects of the perineal operation will be all destroyed by pregnancy, and if a rupture occurred during parturition and were well stitched up by the medical attendant, the recurrence of the prolapse might be prevented. I have no cases to offer in support of my view, as none of these cases have, to my knowledge, yet become pregnant. I have much more pleasure in doing my operations for prolapse, than in operating for retroflexions. In the former case I am so certain of a therapeutic success as well as an anatomical success. In retroflexion cases I can only count on an anatomical success, and it is not the *displacement* that troubles the patient, but something else dependent upon, or supposed to be dependent on the displacement, but which either does not depend upon it or can exist independently of the displacement for a time. In prolapse, the relief is decided and demonstrable; in retroflexion, the relief, though sometimes as decided, is often tardy, gradual and not so patent to the patient or her friends. Slow changes have to take place in the uterus and its appendages; changes that are, I believe, always beneficial and never injurious; changes that tend toward health, and not toward disease; and through these slow changes a complete recovery gradually takes place. (Nos. 8, 13, 24, 19, are examples of this gradual change, among my private cases.)

In operating for retroflexion we must be prepared to find the result a therapeutic failure, owing to the dependence of the symptoms on some other cause, in spite of the most careful examinations and considerations before operation. Or the whole nervous system of the patient may be demoralized, and years of patient struggling back to health may be necessary before health can be gained and vicious habits eradicated. All these things I explain to my patients in retroflexion cases, giving my opinion as to the condition of affairs in each particular case, and promising only one thing, an anatomical success, where the uterus will be put in a straight and normal position, and the ovaries, tubes and broad ligaments raised from their abnormal position. This is the surgical mission of the operation in retroflexion, and this it can perform well when properly done. Beyond this it often cures, generally benefits, is not deprivative, and never aggravates disease.

TABLE OF THE RESULTS OF SHORTENING THE ROUND LIGAMENTS ON THIRTY-FOUR PRIVATE PATIENTS UPON WHOM THE OPERATION WAS PERFORMED.

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 1 | Mrs. L. | 28 | Retroversion and prolapse; pain and dragging; pessary intolerable. | May 1, 1882. | April 20, 1887. | Nil. | Position perfect. | Has been quite well till February last, when she had a hæmatocele after menstruation; is now quite well again; operation a therapeutic success. |
| 2 | Mrs. G. | 30 | Acute retroflexion; pelvic pains and occasional violent general neuralgic attacks; prolonged useless previous treatment. | Feb'y 13, 1882. | May 13, 1887. | Almost nil. | Uterus quite straight and a little anteverted. | Neuralgic attacks unchanged; very hysterical; discontented and flighty; no evidence of disease of appendages. |
| 3 | Mrs. Ca. | 38 | Epileptiform attacks; acute retroflexion and pelvic pains; pessary aggravated them. | July 4, 1883. | Summer of 1885. | Patient restless; wounds suppurated; uterus resumed on third day. | Flexion as before; version remedied. | A therapeutic failure and partly an anatomical failure. |
| 4 | Mrs. Wm. | 26 | Prolapse and retroversion; pelvic pains; sickness; anæmia. | Sept. 6, 1883. | Feb'y 5, 1886. | Almost nil. | Position perfect, as ascertained at operation, as well as per vaginam. | No benefit from operation; got thinner and thinner; vomiting incessant; appendages removed; cystic; died on third day, from continuation of vomiting; no post-mortem. |
| 5 | Miss C. | 24 | Retroflexion; great pain; dilated bladder; incontinence of urine; thin and miserable. | Nov. 28, 1883. | May 7, 1887. | Some suppuration; no fever. | Position excellent; bladder still large, but less in size. | Still pain, but much less; no incontinence; wears a light pessary to give support, as she stands much; health greatly improved. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10 | Nurse in Soho. | | Retroflexion and prolapse; much pain; very neuralgic. | March 12, 1885. | April, 1887. | Very little. | Dr. Heywood Smith says uterus in fair position. | Pain unrelieved; removed appendages in April, '87; neuroma on right genito-crural nerve. |
| 11 | Mrs. Ki. | 40 | Retroflexion; pessary useless; pains, etc. | March 12, 1885. | May, 1886. | Nil, I believe. | Some doubt about position. | *Two* medical men said all right; *one* said tilted *slightly* backward; pains still in pelvis; lost sight of since. |
| 12 | Mrs. Ab. | 40 | Retroversion and prolapse; pains; cannot wear a pessary. | Nov. 14, 1885. | July, 1887. | None. | Position excellent. | All symptoms relieved; heard that she was pregnant some months ago and quite well. |
| 13 | Mrs. Se. | 28 | Retroflexion; pain; bedridden for some years; constipation. | October 13, 1885. | January, 1887. | Nil. | Position normal. | Can walk about comfortably; health restored; patient very grateful for results. |
| 14 | Mrs. Sh. | 50 | Extreme prolapse in a *very* stout lady; unable to go about. | Sept. 17, 1885. | June, 1886. | Profuse suppuration. | No benefit. | Patient, not quite sane, when under morphia, opened up wounds and brought on pyæmia; recovered, but ligaments did not unite. |
| 15 | Miss Ho. | 19 | Acute retroflexion; no cervix; menorrhagia, pain, etc.; pessary no use; prolapsed ovary and adhesions. | Jan'y 22, 1886. | May 1, 1887. | Tried to do without drainage tube; suppuration occurred. | Recoiled after a time. | Mistake in not using drainage tubes, but thought to get union by first intention; patient relieved for a time; now in statu quo. |
| 16 | Miss Ca. | 24 | Acute retroflexion; prolapsed ovary; pain in back, and inability to walk; pessary only partially useful. | March 14, 1886. | May 20, 1887. | Nil. | In excellent position. | Pain in back still in one spot in spine; dragging gone; when last heard of was getting a Prathrœ Smith's Spinal Support. |
| 17 | Mrs. Ma. | 24 | Great dysmenorrhœa; bedridden; anæmic; acute retroflexion and prolapse; pain and dragging. | March 1, 1886. | March, 1887. | Nil. | Excellent position. | Health and strength much improved; some menstrual troubles still, but tolerable. |
| 18 | Mrs. P. | 36 | Acute retroflexion; dragging pains; weariness; dysmenorrhœa and leucorrhœa; large, heavy uterus. | June 25, 1886. | May 31, 1887. | Slight. | Excellent position. | All dragging pains gone; slight leucorrhœa, but feels quite well; a sinus remained in one round ligament for nearly a year; it gave no trouble. |
| 19 | Miss Oc. | 26 | Acute retroflexion; prolapse; bedridden; dysmenorrhœa; anæmic; sufferer for eleven years; neurotic; prolapsed right ovary; tender. | May 19, 1886. | May 1, 1887. | Nil. | Excellent position; ovary out of reach. | Can now engage in all the duties of life; some pain still, occasionally, in pelvis, but general health improving; ovary quiescent. |
| 20 | Mrs. S. | 45 | Prolapse and retroflexion; almost unable to walk; used bath-chair; neuralgic; uterus small. | March 3, 1886. | May 19, 1887. | Slight suppuration; no fever. | Excellent position. | Left ligament fatty, would not pull out; right, strong; can now walk about; looks much stronger; wears a light pessary, a precaution against prolapse. |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 21 | Mrs. Wa. | 38 | Acute retroflexion, and left appendage thickening; bedridden; menstrual and bowel troubles; anæmic. | June 14, 1886. | May, 1887. | Nil. | Excellent position. | Can walk about much better; health being slowly restored. |
| 22 | Mrs. Bu. | 40 | Acute retroflexion; pains; floodings; dragging; almost bedridden. | June 2, 1886. | December, 1886. | Nil. | Excellent position. | Much improved in every way; no complaints since. |
| 23 | Miss Pr. | 21 | Complete prolapse of uterus and vaginal wall and rectum; dragging and discomfort. | Sept. 1, 1886 | May 1, 1887. | Nil. | Excellent position; no prolapse. | Perineum fortified and round ligaments shortened; some tendency to hernia; requests a truss; very lax abdominal walls. |
| 24 | Miss Dr. | 24 | Acute retroflexion; ovarian neuralgia; hysteria; pessary gave no relief. | Nov. 9, 1886. | May 30, 1887. | Nil. | Excellent position. | Has attacks of hysteria and ovarian tenderness. |
| 25 | Mrs. Sl. | 40 | Acute retroflexion; pain; dragging; constipation; ovaries adherent to rectum; dysmenorrhœa. | Nov. 19, 1886. | May 31, 1887. | Suppuration slight; some sloughing of ligaments. | Uterus straight, but retroverted slightly and to right. | Bowels now natural, no dragging or pain except after much walking. |
| 26 | Miss Ca. | 26 | Acute retroflexion; prolapsed painful ovary; inability to wear pessary; urinary troubles. | Nov. 23, 1886. | May 14, 1887. | Nil; stitch irritated. | Position excellent; ovary keeps up. | One ligament slack; had to reopen wound and pull it out further on that side; some suppuration; a sinus still remains; urinary troubles, but gradually becoming less. |
| 27 | Miss W. | 20 | Acute retroflexion; bedridden and helpless, from pain | Sept. 7, 1886. | January, 1887. | Nil. | Excellent. | Much improved in every way, gone back to duties |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 32 | Miss Be. | 27 | Acute retroflexion; adhesion; prolapsed ovary; pain; pessary intolerable. | March 7, 1887. | July 15, 1887. | Nil. | Slight retroversion, but well formed. | Much better every way; scarcely any pain, and very glad operation was performed. |
| 33 | Mrs. Bl. | 42 | Prolapse; retroversion; dragging pain; neuralgia; kept room twelve months. | April 25, 1887. | August 1, 1887. | Nil; perineum at same time. | Position excellent. | Becoming strong and well; all pain and dragging lost, so far. |
| 34 | Mrs. P. | 55 | Prolapse extreme; ulcerated womb and vaginal wall; cannot walk. | October 15, 1885. | May, 1886. | Nil; perineum at same time. | In fair position. | Double hernia found at operation; round ligaments would not run to usual distance success only partial; perineum bulges and requires a perineal support. |

TABLE OF THE RESULTS OF SHORTENING THE ROUND LIGAMENTS ON FORTY-SIX HOSPITAL PATIENTS UPON WHOM THE OPERATION WAS PERFORMED.

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 1 | Eliz. C. | 38 | Prolapse. | Dec. 14, 1881. | May, 1883. | Slight. | Excellent. | Comfortable; cystocele when last seen. |
| 2 | Bridget R. | 45 | Prolapse. | Feb. 1, 1882. | July 30, 1887. | Fair amount. | Excellent (cystocele cured by perineal operation). | No trouble from the uterine disease. |
| 3 | Ellen T. | 28 | Prolapse. | January 4, 1882. | July, 1883. | Slight. | Excellent. | Quite well when last heard of. |
| 4 | Eliz. D. | 30 | Retroflexion; painful menstruation; epilepsy. | Dec. 21, 1881. | May 31, 1887. | Nil. | Excellent position. | Only one ligament shortened; no complaint of pelvic trouble; epileptic attacks much the same. |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 5 | Mary S. B. | 24 | Retroflexion; epilepsy. | March 6, 1882. | May, 1885. | Nil. | Excellent, even after childbearing twice. | Quite relieved from fits up to 1885; not seen since; a small left inguinal hernia; truss ordered. |
| 6 | Anne B. | 34 | Prolapse; pain and pelvic uneasiness. | May 24, 1882. | May, 1883. | Almost nil. | Excellent. | Complete relief when last seen. |
| 7 | Minnie H. | 19 | Retroflexion; pains, dragging, etc. | Sept. 9, 1882. | Nov. 23, 1882. | Slight. | In good position. | Symptoms relieved; patient not seen since. |
| 8 | Anne V. | 32 | Retroflexions; adhesions; discharge. | Sept. 2, 1882. | August, 1883. | One ligament; nil. | Not quite straight, but almost so. | Quite comfortable ever since operation. |
| 9 | Mrs. W. | 40 | Prolapse; pain in back; dragging. | May 2, 1883. | Oct. 29, 1883. | Nil. | Well up and slightly anteverted. | Back quite well; no dragging. |
| 10 | Cath. D. | 24 | Retroflexion; dysmenorrhœa and endometritis. | March 21, 1883. | May 29, 1883. | Slight. | In good position. | Symptoms gone when examined at date mentioned; not since heard of. |
| 11 | Anne H. | 17 | Retroversion; leucorrhœa; urinary incontinence. | January 3, 1883. | March 3, 1883. | Slight. | Good position a month after operation. | Went to Chester on March 3, 1883, quite well; no report since, although address written to. |
| 12 | Mary B. | 26 | Pelvic pain; some retroflexion and prolapse. | Dec. 13, 1882. | January 1, 1883. | Slight. | Uterus in good position. | When discharged, well; not heard of since. |
| 13 | Sarah D. | 28 | Leucorrhœa; endometritis; some retroflexion and prolapse. | October 10, 1883. | Nov. 3, 1883. | Slight. | Well in position. | Went out of hospital quite comfortable; not heard of since. |
| 14 | Mary R. | 39 | Pain in back; vomiting; leucorrhœa; retroversion and prolapse. | August 22, 1883. | July 27, 1887. | Almost nil. | Well in position. | Has felt quite well ever since operation; has now turned up with a cut lip. |
| 15 | Ellen S. | 20 | Prolapse and retroversion and endometritis. | Sept. 12, 1883. | October 29, 1883. | Nil. | Well in position. | No discharge and feeling well. |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 22 | Mrs. R. | 29 | Retroflexion; pains; discharge. | June 18, 1884. | June, 1886. | Nil. | Excellent position. | No troubles referable to uterus; tertiary syphilis developed; nodes, caries, etc. |
| 23 | Agnes F. | 24 | Epilepsy; retroflexion; dysmennorrhœa; mania. | Dec. 18, 1884 | July 20, 1887. | Nil. | Excellent position. | No menstrual troubles; epilepsy as before; not so maniacal. |
| 24 | Eliz. K. | 30 | Dragging pains; discharge; dysmenorrhœa; retroflexion. | Sept. 6, 1883. | October 6, 1883. | Some suppuration. | In good position. | Can find no record of her after this date. |
| 25 | Mary A. R. | 30 | Extreme prolapse; pessary useless. | Sept. 4, 1884. | March, 1887. | Nil. | In good position. | Extreme cystocele and rectocele a light ring keeps them up; refused lower operation, as she is now quite comfortable. |
| 26 | Mgt. C. | 37 | Extreme prolapse; pains; pessary useless. | June 10, 1885. | May, 1886. | Nil. | In good position (perineum fortified). | Heard several times that she was well; a very bad case and an excellent result. |
| 27 | Georgiana A. | 30 | Retroflexion; pains; thickened right appendages. | July 15, 1885. | July 30, 1887. | Nil. | Excellent position. | Feels quite well; a small left inguinal hernia; came for truss; appendages cannot be felt. |
| 28 | Rebecca M. | 40 | Extreme prolapse. | Sept. 2, 1885. | January 1, 1886. | Nil. | Excellent position (perineum fortified). | Quite well every way; not heard of since. |
| 29 | Jane S. | 26 | Prolapse; extremely short vagina. | Sept. 2, 1885. | January 4, 1887. | Nil. | Prolapse as bad as ever, although perineum fortified (malformed organs). | Pulled up second time until could feel fundus uteri and ovaries beneath abdominal wall; yet uterine neck protruded at os. |
| 30 | Mary B. | 21 | Complete prolapse; uterus hanging between thighs. | Sept. 28, 1885. | About a year after. | Nil. | In good condition (perineum fortified). | Dr. McClelland has seen her several times; no word of any prolapse or symptoms. |
| 31 | Anne S. | 22 | Complete retroflexion; pains and discharge. | January 20, 1886. | | Nil. | In excellent position. | Was quite well when last heard of. |
| 32 | Anne D. | 23 | Retroflexion; pains extreme; discharge; dysmenorrhœa. | March 10, 1886. | April 10, 1886. | Nil. | In excellent position. | Insisted on going out, as she felt quite well; not heard of since. |
| 33 | Eliz. S. | 31 | Retroversion; amenorrhœa; pains in back, etc. | June 11, 1886. | July 11, 1887. | Almost nil. | Excellent position. | Quite well menstruates but scantily still. |
| 34 | Mary H. | 25 | Retroflexion; pain; discharge; weak chest. | July 7, 1886. | Died of phthisis Sept. 26, 1886. | Almost nil. | Excellent position; plenty of room for bladder; ligaments cicatrized to ring and strong. | Felt well while she walked about, but could not walk much; no suspicion that phthisis was pyæmic; uterine discharge ceased after operation. |
| 35 | Mary Sh. | 25 | Prolapse and retroflexion; pains; leucorrhœa. | March 3, 1886. | Sept. 25, 1886. | Nil. | In good position. | Feels very well not seen since. |
| 36 | Jane R. | 41 | Retroflexion and prolapse; pessary failed; dragging and ulceration. | August 4, 1886. | August 1, 1887. | Almost nil. | In good position. | Is a scourer in workhouse; feels quite well. |

| No. | Name. | Age. | Symptoms for which Operation was Performed. | Date of Operation. | When Last Seen. | Amount of Surgical Disturbance. | Anatomical Results when last seen. | Therapeutic Results, Remarks, Etc. |
|---|---|---|---|---|---|---|---|---|
| 37 | Mary P. | 44 | Complete prolapse; discomfort and pains; unable to walk. | July 28, 1886. | June 17, 1887. | Nil. | In good position (perineum fortified). | Patient in situation; feels better than she has done for years, and able to do a hard day's work. |
| 38 | Sarah R. | 42 | Prolapse of uterus and rectum; much discomfort. | August 11, 1884. | March 28, 1885. | Nil. | In good position (perineum fortified). | Was then quite well; has been seen on the street since, but not spoken to; looked well. |
| 39 | Eliz. G. | 35 | Complete prolapse and hernia. | Sept. 22, 1886. | Dec. 13, 1886. | Nil. | In good position (perineum fortified). | Ligaments moved in spite of hernia; felt quite comfortable when seen, in December. |
| 40 | Mgt. E. | 34 | Pelvic pain and distress for seven years; retroflexion and prolapse. | October 19, 1886. | January 1, 1887. | Nil. | Good position. | Goes about all day; free from pain, and not at all tired at night; works hard. |
| 41 | Euphemia S. | 45 | Complete prolapse; inability to work; pains. | Nov. 17, 1886. | June 16, 1887. | Nil. | Excellent position (perineum fortified). | Quite well when last seen. |
| 42 | Mary A. L. | 55 | Prolapse and retroflexion of uterus and prolapse of anus; pain; discomfort. Two years ill with pain in | Feb. 2, 1886. | April 4, 1886. | Nil. | In good position (perineum fortified). | Went out well; not since heard of. |

Dr. WILLIAM L. REID, Glasgow, Scotland, read a paper on—

# THE REMOTE RESULTS OF THE OPERATION OF SHORTENING THE ROUND LIGAMENTS FOR DISPLACEMENTS OF THE UTERUS.

## RÉSULTATS ÉLOIGNÉS DE L'OPÉRATION DU RACCOURCISSEMENT DES LIGAMENTS CIRCULAIRES POUR LES DÉPLACEMENTS DE L'UTERUS.

## DIE FERNEN FOLGEN DER OPERATION ZUR VERKÜRZUNG DER RUNDEN MUTTERBÄNDER BEI LAGEVERÄNDERUNGEN DES UTERUS.

I presume that every one in this room understands that the operation of shortening the round ligaments consists in dissecting down upon the external abdominal ring, catching up the terminal fibres of the round ligament as they appear there, pulling out as much of them as suffices to restore a displaced uterus to something like its normal position, and stitching the shortened ligaments to the pillars of the external ring. I also presume it is well known that, although Drs. Alexander and Adams published the details of the operation early in April, 1882, and that it has been practiced since that time in various countries, yet that great difference of opinion exists as to whether or not real benefit has been derived by those who have been subjected to its influence.

I early took an interest in this operation, and have performed it thirteen times, reserving it for those cases in which the symptoms were urgent, and had resisted other and more ordinary forms of treatment. A few of these cases are now some years old, and I propose to give you the facts of their past history and present condition, in order that you may judge of the results for yourselves. Here I ought to premise, that the words "remote results," in the title of this paper, are held to mean, results observed at least a year after operation. With a view of bringing out the experience of other gynæcologists, I wrote to various medical friends, who were likely to be able to give more or less authoritative opinions on the subject. A number of them could express no opinion, from lack of experience; others sent me particulars of cases which I should have liked to quote here, but unfortunately the time at my disposal will not allow me to do so. I shall, therefore, simply cite some of their opinions.

Dr. J. Matthews Duncan, London, says: "I do not regard retroversion or retroflexion as a disease in itself, therefore, I would expect little from shortening the round ligaments. I feel sure (as is corroborated by cases) that such shortening will not retain in new position, if there is any considerable tendency to retroversion or retroflexion. I lately saw a case which had been operated on by a high authority in such operation —if not the highest. More than a year had elapsed since the operation. The patient declared herself worse than before the operation. The uterus was in a state of what a displacement theorist would call aggravated anteversion. But one case can decide nothing."

Dr. Halliday Croom, Edinburgh, says: "I think well of the operation of shortening the round ligaments. In two cases I have only been able to find one round ligament, and in two, both. In all these cases there was marked improvement."

Dr. Skene Keith, Edinburgh, says: "My single case, one of retroversion, kept well for nearly three months, and then the uterus became displaced as badly as before. I have been on the outlook for another case, but have not had one."

Dr. William Alexander, Liverpool, who first performed the operation on the living subject, sends a paper, detailing his experience, to this Congress.

Dr. Clement Godson, London, says: "A patient came to me, a long time back, with retroversion and prolapse, for whom I inserted a Hodge pessary. I never saw her

again for a couple of years, I think, when she turned up, sa
erpool, and was persuaded to see Dr. Alexander, who took
on her, without any benefit to her. Her discomfort wa
bearing-down. I examined her and found not the slightes
version."

Prof. W. S. Playfair, London, says: "I have only seen
with no beneficial results, that I could see. The other case
tralia. The patient assured me that the operation had ha
she could estimate. The case, however, appeared to me
rectomy was indicated, and I should not myself have consi
round ligaments as likely to be of any service."

Dr. John E. Burton, Liverpool, says: "Although I hav
of the cases on which I have performed Alexander's operat
number that have now been operated on for at least three
nite views as to the value of the operation. I am quite sa
non-adherent uterus, prolapsed or displaced backward, can
forward, and maintained in that position permanently. . .
have borne living children since the operation; two of t
pregnant or borne a living child, and in two cases the opera
of some years' standing. I am sure a number of my pati
without pessaries, who, without the operation would be do
look upon the operation as a useful one. It will do cert
certain things are necessary or expedient, every surgeon wil

Dr. George Elder, Nottingham, says: "Subsequent to
the patient became as bad as ever. I have for some time a

Dr. H. A. Lediard, Carlisle, has operated on six cases,
lowing results: One completely cured and now four and a
from the first; two temporarily successful, and two success
not been seen lately.

Dr. Francis Imlach, Liverpool, says: "I have performe
the round ligaments fifty-seven times: thirteen times fo
remainder for retroflexion and retroversion. . . . In my
little operation, I hold by my article in the *Edinburgh Med*
In that paper he states that, "In simple prolapse and pain
the uterus, it is eminently successful. But where there is
is practically useless, and these complications are gener
troublesome cases of prolapse."

Dr. James A. Adams, Glasgow, who shares with Dr.
gesting the operation, says: "The majority of cases on whi
those in which prolapse existed, but I have had one or tw
flexion. In the most of these cases marked improvement
improvement has continued some years. . . . On the whol
tion in cases of retroflexion and prolapse. I should, how
only if the condition occasioned distress, or if it were a pr

"The operation is one that all and sundry cannot perfo
otherwise well qualified obstetric and general surgeons cond
they consider the round ligaments to be mythical structures
out *something* and passed a few sutures through it. Ther
pulling out too little than too much."

Prof. Wallace, of Liverpool, says: "I look upon the op
and likely to be a failure, which practically it is, from the
I have asked Dr. Alexander to permit me to overhaul a do

but the opportunity has not yet arisen, and, I fear, never will. In one class of cases only can it be imagined as of possible help, namely, in women past the child-bearing period, in whom all other treatment has failed. Theoretically and scientifically in all other cases it has not a leg to stand on, and is a failure in every case but one I have seen, and that, and most all of the others, could have been cured by other measures. The end is worse than the beginning."

You will gather from these statements that the bulk, if not also the weight, of professional opinion, as thus represented, is against the usefulness of the operation.

I shall now, and meanwhile without comment, give you short sketches of such of my own cases as are more than a year old.

CASE I.—Mrs. McG. Had one child eleven months after marriage at twenty, and has been an invalid ever since. Suffered most from backache, inability to walk and dyspareunia. The uterus was found four inches in depth and badly retroflexed, with prolapse of left ovary. Patient was treated at the Western Infirmary for over two years, but with only passing benefit. The round ligaments were shortened on Nov. 1st, 1883, and wounds healed within a month, during which time the patient was mostly in bed. She wore a pessary for another month, going about freely. Her condition on July 23d, 1884, nine months after operation, was as follows: Dysmenorrhœa and dyspareunia gone, micturition normal, defecation much improved. Is able to walk two miles without special fatigue; still suffers from backache and pain in left ovarian region, although since the operation the ovary has not come within reach. Uterus three and a quarter inches in depth; cervix eroded, and considerable muco-purulent discharge from the os uteri.

On April 8th, 1885, eighteen months after operation, the actual cautery was used to cervix, owing to persistence of the above symptoms.

April 14th, 1886, two and a half years after operation. Has none of her old symptoms now except backache after exertion occasionally, and a tendency to diarrhœa on rising in the morning. Uterus is still three and a quarter inches in depth; cervix sound; body of uterus well up in pelvic cavity, but fundus leans distinctly backward.

August 4th, 1887. Three years and nine months after operation, patient is menstruating regularly and normally; no leucorrhœa; dyspareunia quite gone; micturition and defecation normal; can walk three or four miles without fatigue, but feels pain in left cicatrix on lifting heavy weights, which she is often obliged to do in her daily work. Has backache for an hour or two occasionally, never following exertion, but only on rising after being some hours in the horizontal posture. Uterus is lying in the normal position, having lost the tendency to retroversion noticed a year ago. The sound passes to three and a quarter inches and somewhat toward the left side of the pelvis. The ovary cannot be felt. Scars are quite sound, and there is no evidence of hernia. In reply to a question, patient states that she would willingly undergo the operation again in like circumstances, referring especially to the absence of dyspareunia, and the ability to walk and do hard work.

CASE II.—Mrs. H., æt. thirty-six. Had one child a year after marriage at twenty, and since its birth has suffered from backache, bearing down, leucorrhœa, frequent micturition, and morning diarrhœa. There is no dysmenorrhœa of the usual type, but patient has severe headaches, often accompanied by delirium for a day or two before and during the periods. The uterus was found severely retroverted; three and a half inches in depth; much hypertrophied, and with a patulous cervix. For three years all the usual methods of treatment were tried, with only temporary relief, and on Nov. 3d, 1883, the round ligaments were shortened.

July 2d, 1884, eight months after operation, the uterus was found somewhat anteverted and three inches in depth. Patient complained of leucorrhœa and backache,

with pain in left ovarian region. She had now no trouble
the headaches were almost gone, and she was able to do a g

Aug. 6th, 1887. Three years and nine months after
position; somewhat anteverted; still hypertrophied; the
direction to three inches. The cervix is large and conside
exists. The cicatrices are sound and no tendency to hernia
very stout and florid, and looks the picture of robust hea
just as bad now as before the operation, but that in the co
seven months during which she felt perfectly well, and
exertion, but that headaches, backache and pain in lef
returned. Being interrogated, she admits that her pains
operation, and that now she walks about pretty freely.

Case III.—Mrs. M., æt. 45. The mother of four child
teen years from profuse leucorrhœa, backache, bearing dow
walk, that for the year before the operation patient was al
uterus was greatly hypertrophied, three and a half inches
of exaggerated retroversion. All kinds of tampons and
those which at all successfully sustained the uterus soon
pressure on surrounding parts. She was operated on, Febr
1884, four months after the operation, patient was able to
go about to a considerable extent; the uterus was slightly
depth, and not tender.

August 2d, 1887. Three years and a half after oper
menstruating and there is no leucorrhœal discharge; the u
anteverted, the sound passing to three inches in the norm
firm, no tendency to hernia. Micturition and defecation q
strong and can only do light household work, but states tha
and better than for the past fifteen years.

Case IV.—May 23d, 1884. Mrs. McC., æt. 33, was m
had three children naturally, and has been a widow for thr
half inches in depth; prolapsed to third degree; very heav
to vaginal roof; perineum quite gone. No pessary could
hour, except when patient maintained the horizontal po
shortened on June 19th, 1884. Patient was kept in bed fo
bed for a few hours daily during the third week, at the
leaving the institution.

July 30th, 1887. Three years and a month after op
Patient wore an ordinary Hodge pessary for three months fr
and felt quite well. She did not show herself again, beca
that she was ashamed to come. At the end of that time,
pessary was expelled, and a week or ten days afterward p
down, and also a swelling in her left groin. She was, h
year and a half after the operation got married, becoming
ward. She felt very well and comfortable during her pre
lasting less than half an hour, although her child was larg
after her confinement, the uterus came down as badly as b
states that she can go about pretty freely, as she has none
suffered before that time. Micturition and defecation n
uterus is found low down in the pelvic cavity, not retr
inches deep and not tender. In the upright position th
The scar in the right groin is sound, but in the left the ing
when patient stands up, a piece of bowel comes down with

CASE V.—Mrs. McD., æt. 31. Married at twenty-three. Had a child ten months after marriage; forceps used; perineum badly torn, and not sutured. Prolapse to second degree resulted within three months. Three years afterward a second child was born, also with forceps, and prolapse to the third degree ensued, the whole of the uterus coming beyond the vulva.

On May 4th, 1885, two years after the birth of the second child, the round ligaments were shortened; Prof. Leishman having seen the patient and suggested the possibility of good resulting from the operation. The wounds healed almost by first intention. Patient was kept in bed for seven weeks and a Hodge's pessary worn for about three months. Before the operation, no pessary which was endurable could be kept in position. Fourteen months afterward she again became pregnant, having meanwhile worn a perineal bandage, not because the uterus came down, but because it relieved a feeling of bearing down, which still troubled her. Pregnancy went on naturally, except that patient had more sickness than on the two former occasions. She was delivered a third time by forceps, owing to uterine inertia, as on the two former occasions. Patient was kept nearly a month in bed and nursed her child. Since its birth, she has again recourse to the perineal bandage, to relieve a feeling of bearing down.

Examined on July 1st, 1887, two years and two months after operation; the uterus was found two and a half inches in depth, pretty closely drawn up behind the pubis, and the cervix could not be pulled down to the vulva with moderate force. Patient states that although still suffering from some degree of bearing down, she is quite pleased to have undergone the operation, for the sake of the relief that has followed. The uterus has never appeared at the vulva since the operation, and there is no evidence of any pathological condition further than sagging down of the base of the bladder, possibly due to the uterus leaning too closely against the pubis, but more probably to persistence of the cystocele, which formerly coexisted with the prolapse.

CASE VI.—May 5th, 1885. Mrs. S., æt. thirty-seven; married at twenty-nine and has had four children naturally and three miscarriages. Prolapse has existed for three years. Micturition and defecation are both painful and difficult. Prolapse to third degree is found, with severe cystocele and rectocele. Various forms and sizes of pessary were tried, but none remained for more than a few hours.

On June 15th, 1885, the round ligaments were shortened. Patient was kept a fortnight in bed, and rested a great deal for the third week, when she was dismissed, wearing a Hodge pessary.

On October 5th, 1885, nearly four months after operation, the pessary was removed, the uterus being in good position and patient feeling well.

July 28th, 1887. Two years and a month after operation. Patient states that for a year after the pessary was removed she felt weak and unable for much work. Now she feels strong and well and does all her household duties quite comfortably; menstruates regularly and has no trouble with her bowels or bladder. The uterus is found high up in pelvic cavity and slightly anteverted. The sound passes easily to three inches, forward and somewhat to the right side. The vaginal fornices have a loose, baggy feeling. The scars are quite sound and there is no tendency to hernia.

CASE VII.—January 29th, 1886. Mrs. H., æt. forty-six, was married at twenty-five and has had four children naturally, the last fifteen years ago. Since the birth of this child, patient has suffered from falling of the womb, which has lately incapacitated her for any work: the tumor coming down nearly to her knees and giving much distress during micturition and defecation. The uterus was found severely prolapsed, the whole of the bladder and a large part of the rectum being beyond the vulvar orifice. The cervix is much hypertrophied and ulcerated and the sound passes six and a half inches within a large and heavy uterus. Various attempts to return the prolapsed

mass were unsuccessful. After patient had been kept in be
replaced and the ligaments shortened on February 20th, 1

On May 30th, 1887, fifteen and a half months after oper
She stated that she felt quite well except for a little dif
dragging in the groin after she exerts herself, which she h
able extent. A certain degree of cystocele existed, and t
been lengthened out to an extraordinary degree by the lo
lapse. The cervix was high up and rather far forward: th
pelvic cavity being occupied by what seemed a cellulitic
pressure of a very large Hodge's pessary which was wo
operation.

The sound passes perpendicularly upward to three inc
fixed to the hard mass behind it. The scars were quite
existed nor was there any hardness or tenderness to be f
A small watch-spring pessary was introduced, to prevent t
cystocele.

July 1st, 1887, sixteen and a half months after the o
she felt quite well, was doing hard work, and had no trou

CASE VIII.—Mrs. N., aged thirty, October 8th, 1880.
and confined naturally a year afterward. Ever since ge
leucorrhœa, bearing-down, backache, burning pain in hyp
reunia. Uterus found low in pelvic cavity, badly retrove
phied and eroded. The sound passed backward to three a

July 24th, 1886. After trying all kinds of treatment
cerine tampons and hot douches, during the past six year
shortened at this date.

Aug. 3d, 1887. A year and a week after operation.
in bed, and rested for the greater part of another week
months, then taken out, as she felt well, and the uterus
weeks afterward she lifted a heavy tub and felt pain in t
and on examination the uterus was found leaning backwar
sary was again introduced and worn until May 26th, 1887,
introduced. Now, the uterus is found rather high up in
perpendicular, the sound passing to three and a quarter
freely movable, being fixed as if from behind. The cervi
quite firm, but on coughing, pain is felt in their neighborh
exists. Menstruation goes on naturally, and micturitio
normal. Nothing can be said with regard to dyspareun
been abroad since before the operation. She complains of
and of an occasional feeling of pain in vagina, which pas
She states that she can walk very well.

This record, gentlemen, is not that of cases selected in
mine any particular theory or conclusion, but is an unva
regard to every case on which I have operated and which
could have wished the results more brilliant; but such as
lated as follows:—

Nos. 6. and 7. Meanwhile completely cured.

No. 1. Almost cured.

Nos. 3, 5 and 8. Considerably improved.

No. 2. In about the same state as before the operation.

No. 4. Worse than before the operation, inasmuch as
exists.

Viewed in the light of a mechanical operation for a mechanical purpose, *i. e.*, the restoration of the uterus to nearly its normal position, the results may be thus stated:

Nos. 1, 2, 3, 5, 6 and 7 cured.

No. 8. Very greatly improved.

No. 4. As bad as before operation.

With a careful operator and a cautious patient, there ought, I think, to be no after bad results, but it will be observed that aside from failure to sustain the uterus, I have had one lamentable accident, that of hernia, in the fourth case described. This leads me to offer some remarks on what may be termed the accidents of the operation, and give such hints for their avoidance as are suggested by my personal experience.

1. *Hernia.*—To be avoided by dissecting down, not on the external ring, but on the tendon of the external oblique muscle, a little way above the ring, so that the terminal fibres of the cord may not be destroyed, and no necessity exist for opening up the inguinal canal to reach the cord. Severe exertion should be avoided for at least six months after the operation. I also believe it wise to pass one or two deep sutures across the inguinal canal, in order to occlude the pouch of peritoneum which is dragged down into it. This prevents a knuckle of bowel from being forced down and a tendency toward hernia set up.

2. *Relapse into former condition of Displacement.*—This is to be avoided by thorough fixation of the ligament to the pillars of the external ring, special care being taken to include at least three-quarters of the thickness of the cord in each ligature. It should be mentioned that Dr. Imlach, who has had large experience, advises but one fine silk suture for this purpose. The patient should be kept at least a month in bed, and wear a well-fitting pessary for six months after the operation, or longer, if her occupation be laborious. It is very noteworthy that a pessary which would not remain many hours in position before the operation, does so quite well after it. If at all possible, the patient should be spared much exertion for three or four months.

3. *Peritonitis and Cellulitis.*—There have been several deaths after the operation reported as due to these affections. They are to be avoided by keeping the wounds aseptic, well drained, and by not stripping the peritoneum from the cord, but including it carefully in the sutures. In this way the general cavity of the peritoneum will not be opened, and the pouch which is formed by dragging down the ligament will be safely closed by adhesive inflammation.

4. *Failure in getting the Ligaments to run out.*—This is to be avoided in the majority of cases, by a careful pelvic bimanual examination, to ascertain whether or not cellulitis has existed to any marked extent, especially in the anterior part of the cavity. I believe, however, that cases exist, although I have never met with one, where the non-running power of the ligaments cannot be known until they come to be pulled upon during the operation.

At the annual meeting of the British Medical Association at Belfast, in 1884, I read an account of my first three cases, and in regard to the results then, said, "It seems to me that we cannot promise much in the way of certain and immediate relief from this operation. It remedies the Position, but not the Condition of the uterus." I still adhere to that opinion, but the lapse of time and further observation of these cases warrant me, as I think, in saying that correcting the position of a badly displaced uterus is the first and a very important step in the permanent and thorough cure of the otherwise diseased conditions of that organ and its appendages. Some men state that they never meet with retroverted and prolapsed uteri which cannot be comfortably sustained by pessaries or bandages. Such has not been my experience, and so far as my knowledge goes, restoration of the perineum in bad cases of retroversion and prolapse has been less successful than shortening the round ligaments. Especially is this the case in young, child-bearing women.

The conclusion to which I have now come is this. Wher and the uterus severely retroverted or prolapsed, so that it safe pessary, I should consider the propriety of shortening liminary to other treatment. If the patient were a fairly h any past or present pelvic inflammation, and if she wer moderate care of herself for six months afterward, I shoul recommending and performing this—as I believe it to be i operation.

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# THE CORRECTION OF UTERINE DISPLAC ANDER'S OPERATION, WITH REPORT OF

## CORRECTION DES DÉPLACEMENTS UTÉRINS PAR L'OP AVEC RAPPORT DE VINGT CA

## DIE BEHANDLUNG DER LAGEVERÄNDERUNGEN DES UTI DER'SCHE OPERATION, NEBST BERICHT ÜBER Z

J. H. KELLOGG, M.D.,

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Mr. Chairman, Ladies and Gentlemen.—In respo chairman to prepare a paper for this Section, I have chos because I have anything startlingly new to present, but b from my own experience additional clinical evidence of wh most important contributions to modern gynæcological su adverse opinions which have been expressed regarding the its results. The operation of shortening the round ligan ander seems to have grown very slowly in favor with the the clearness and ability with which the operation and its and set forth by Dr. Alexander himself in his little mon lished some three years ago. Until about one year ago, I sh regarding the permanent utility of this operation; but at case of procidentia of a most aggravated character, which i of the operation. I had operated upon this patient two ceeded in affording temporary relief by means of repair of performance of anterior and posterior colporrhaphy. F relieved, when the uterus came down again as far as eve paratory dissections, I undertook the operation with much Mundé had reported himself unable to find the ligaments i which he had operated. I succeeded, however, in securin waiting over four months to test the results, I became so t value of the operation that I have continued to employ i have, up to date, operated twenty-two times. The last tw so recently that they are not yet out of the surgical ward, not included them in this report. Of the twenty cases ope of procidentia, three of retroversion with prolapse of ovarie ovarian prolapse, and one of extreme anteversion. To avoi cessary details, I will present simply a brief abstract of results.

As indicated in the enumeration of the cases already given, more than half of the cases operated upon were suffering with retroversion and flexion, and prolapse of the ovaries. The first of this series of cases was a young woman aged twenty-five years, who had been an invalid for seven years, during which time she had been treated by means of all sorts of pessaries, each of which had been abandoned as unendurable after giving partial relief for a few weeks. The displacement was attributable to a fall from a carriage. The patient had also been subject to epileptic attacks at the menstrual periods ever since the accident, also exceedingly painful dysmenorrhœa. I shortened the ligaments three and one-half inches, and inserted an intra-uterine stem to control the flexion, which was quite rigid, the uterus being very hard. On the third day there was much pain from the intra-uterine stem and three epileptic attacks, to relieve which I removed the stem. Patient made a good recovery, and when discharged, six weeks after the operation, was in better health than for many years; was free from nearly all of the old symptoms, and when heard from a few weeks ago, had had no return of the epilepsy, although more than six months have elapsed since the operation. When last seen, the uterus was held well forward, although the enforced premature removal of the intra-uterine stem had allowed a slight backward flexion.

The next case was a Miss C. B., aged twenty-five; a complete invalid; in constant pain and very wretched; obliged to keep the bed during menstruation, which lasted six days, and was extremely painful. Shortened ligaments four inches. Patient discharged from the surgical ward in twenty-four days. Is now well and strong; works all day; menstruates but two days, and without pain. Uterus and ovaries have now remained in normal position nearly six months without the aid of a pessary.

Mrs. M., had suffered for nine years from retro-displacement of the uterus, and prolapse of ovaries. Menstruation very painful. General health very bad ; very neurotic. Although warned against the operation, as being difficult and dangerous, by her family physician and a professor of gynæcology in a medical college, she insisted on its performance, and has not regretted her decision, as she now reports herself, nearly six months since the operation, in perfect health, and relieved of all her old symptoms; able to walk all day, without pain or great fatigue.

Mrs. B., suffering from the results of subinvolution of the uterus and the vagina, of nine years' standing. Severe dysmenorrhœa, so weak and neurotic as to be confined to the bed most of the time. Shortened ligaments four inches. Patient returned to her home in another State in seven weeks, relieved of all her old symptoms, and with uterus and ovaries in good position. Subsequent reports indicate continued improvement in strength and vigor, and no return of the displacement.

Mrs. V. Case much the same as the preceding. Was unable to withdraw the ligament on the right side, apparently the result of deep adhesions. Closed wound, and did not operate upon the left side, but expect to do so at some future time. Wound healed without exciting any inflammation.

Mrs. W. Patient ill for several years, and for most of the time bedridden. Erosion of cervix; uterus nearly double normal size; indurated and tender. Constant pain in left side. Tenderness and throbbing all about the uterus. Ligaments shortened four inches. Left the ward in about three weeks, and in ten days more was allowed to walk, and to return home under care of a trained nurse. I examined this patient recently, nearly five months since the operation. Ovaries and uterus were in normal position, just as left by the operation. Has worn no pessary since the operation. Some neuralgic pain in left side still, but disappearing. This was such an aggravated case that a surgeon of some repute, who saw the patient just before she came under my care, informed her that she had carcinoma, and that her case was hopeless. Uterus is now of normal size, and perfectly sound.

Miss L., aged twenty-nine; extremely neurasthenic and mentally depressed.

Menstruation profuse and very painful. Uterus large, ter
hollow of the sacrum. Ligaments shortened four and one-h
her feet in four weeks, without a pessary. In about t
developed on right side, due to absorption or retraction of a
which came down with the ligament and filled the opening
I subsequently performed Dr. Marcy's operation for radical
pillars of the ring by kangaroo tendon, and have heard o
Uterus and ovaries have remained in perfect position till t
five months since the operation, and the dysmenorrhœa an
In operating for cure of the hernia I found the end of t
imbedded in the wound, and easily distinguishable by its
it still retained.

Mrs. M., aged thirty-nine, had suffered from displacem
for several years been a complete invalid, suffering with all
ent in cases of this sort. Found ligaments very small an
withdraw the left one. One week after the operation was
the posterior cul de sac, and thought the operation a failu
the uterus well anteverted. It remained in this position for
time the patient was greatly improved. I have recently he
to the instructions, she had allowed herself to strain violent
stipation, and had forced the organ back again. She desire
of the operation.

This case is interesting, as showing that a single slender
up, by its constant traction, a considerable adhesion which fo
in a backward position. When last seen, some weeks after
uterus was in perfect position, and I doubt not it would ha
not been again displaced by a mechanical cause which mig
should have been.

[Shortly after this paper was written I saw this pati
slightly retroverted. After keeping the organ in position
of a lever pessary, it remained in place. The patient was
before the operation.]

Miss H., aged thirty. Had suffered from retroversion
prolapse for several years, and had gradually become worse
who had done for her all that could be done by the aid
pelvic viscera were tender. Obstinate constipation was pres
five inches. Patient left surgical ward in twenty-four days
two weeks later, with uterus and ovaries in perfect position
Bowels have been regular since the operation. When heard
was doing finely.

Miss R., aged nineteen. Had been an invalid for three
a block. Extremely nervous. Obstinate constipation. Te
periods. Steadily getting worse, though constantly under
ligaments four and one-half inches. Patient left ward in th
ated four times since the operation. Bowels are regular,
better than she ever did in her life before. Is able to wall
vigorous exercise in a gymnasium daily without inconvenie

Miss N., aged twenty-five. A confirmed invalid for fo
less, emaciated. Uterus sharply retroflexed, left ovary e
ovaries very low down. Ligaments shortened four and one
very slender and at first did not control the retroflexion full
which was worn a few weeks. Uterus is now kept in

pessary, although before the operation it came down as soon as the instrument was removed. Ovaries are apparently normal, and out of reach.

Mrs. M., aged thirty-four. Had suffered from the usual symptoms of retroflexion and version for many years. Ovaries large and tender. Uterus lying low in the hollow of the sacrum. Ovaries also prolapsed. Great pain at menstrual period. Mental depression and constant headache.

Operation July 21st. Patient left the ward in four weeks, on her feet, and has since been steadily gaining in strength. She is really well, much better than she has been in many years. Uterus is in normal position, of normal size, and there are no symptoms of pelvic disease.

Mrs. B., aged thirty-two. Suffered for a number of years with extreme retroversion. Ovaries prolapsed, enlarged and tender to such a degree that a pessary could not be worn. Pressure upon the ovaries sometimes caused excessive vomiting for several days. Patient was greatly emaciated when she came under my care, as the result of an attack of vomiting of this sort, which she believed to have been brought on by the rather rude manipulation of the ovaries by her family physician, who had urged the removal of the ovaries for the relief of the reflex disturbances, which had rendered the patient very wretched for many years, until she almost despaired of relief.

Shortened ligaments five inches. Closed the wound in the usual manner. Secured the ends of the ligaments over a lead plate. Wounds healed promptly. Patient left the ward in eighteen days, going about in a wheel-chair. After ten days more, was allowed to go upon her feet. Both uterus and ovaries remained in excellent position without the use of supporter of any sort, though small medicated cotton pledgets have been used for the purpose of relieving chronic vaginal catarrh. This case clearly shows that in some cases Alexander's operation may well be substituted for that of removal of the ovaries.

Miss R., aged twenty-four. Had been ill a long time. Confined to bed for nine months within the last year. Patient very feeble and emaciated. Suffered constant and distressing digestive disturbances, spinal pain and irritation, general neuralgia. Menstruation very profuse and extremely painful; pain of a spasmodic character, and relieved only by a narcotic. Profuse leucorrhœa. On local examination, found uterus retroverted and flexed. Ovaries large and tender. Uterus easily replaced by the sound. When the uterus was held in position, ovaries could not be felt.

Operated in the usual way. Shortened the ligaments four and a half inches. Wound healed well. Patient allowed to go out of ward in a wheel-chair after ten days. Left ward entirely in three weeks. The uterus is held well forward, so that the fundus can be felt in front, but there is little change in the position of the ovaries. They seem to be held by adhesions. However, the patient is wholly relieved of the distressing digestive disturbances, spinal pain and neuralgia. Has gained very considerably in flesh, and menstruates without pain. Ovaries are lessening in size, and I trust much good if not an entire cure will result from the operation. Previous to the operation patient had been in the hands of excellent physicians for a long time, who had tried all sorts of pessaries, and finally abandoned the case as one for which nothing could be done.

Miss B., aged twenty-one. Patient always feeble. According to account of mother, weighed but three pounds at birth. Menstruation began at twelve. Very profuse and painful. The patient showed evidence of breaking down at fourteen, and has become more and more of a confirmed invalid since. When she came under my care, was very feeble. Had the usual symptoms of neurasthenia and spinal irritation, insomnia, and constant pelvic pain; confined to bed much of the time. Found uterus retroverted, prolapsed and enlarged; ouaries tender, granular degeneration of the os uteri, bad cervical and vaginal catarrh. Menstrual period very profuse and exceedingly painful.

Constant rectal tenesmus. Patient wholly unable to stand
move the legs without great pain. Pain most severe in the

Shortened the ligaments four inches. Wound healed
Patient allowed to go about in wheel-chair at the end of tw
left the surgical ward, free from pain, sleeping well. Uteru
derness and in normal position. Menstruation painless. P
care this patient had been having local treatment at the ha
than a year, but with no material benefit.

Miss B., aged eighteen, German descent. Suffered from
in back and inguinal region for three years, the result of be
out-of-door work when a child. Menstruation has alwa
exceedingly painful. Profuse cervical and vaginal catarrh
for a year, wearing pessaries of various sorts, but with no l

Shortened ligaments four inches. Wound healed readily
days. After two weeks was allowed to go upon her feet.
since the operation, but thus far the patient is wholly relieve
pain. The uterus remains in normal position. Menstruati

Of the two cases of procidentia, the first, that of Mrs. I
The uterus was wholly outside the body, and remained so
lying down. All sorts of pessaries had been tried and ab
was developed before marriage, and was aggravated by
Only temporary relief was obtained by thorough-going oper
perineum. It is now nearly a year since the performance
The patient left my care and returned to her home in a wee
after the operation, sooner than I desired, and engaged in
Six months later she reported that she was able to be upo
been recently examined by her family physician and pronou

My second case of complete procidentia was less success
aged forty-seven, had never been pregnant. Had suffered
and a great variety of general and local symptoms, for ele
menstrual period. Eighteen months previously I had per
rhaphy by a modification of Simon's method, after which i
womb in position by a lever pessary. Previous to this
remain in position for five minutes when the patient was o
of an inflated ball. The patient was very comfortable fo
pessary became misplaced and began to give discomfort. It
physician, who did not succeed in again affording relief by
again consulted me, March 23d, 1887, when I found the con
cidentia, nearly as bad as before the operation.

In operating, was able to shorten the ligaments only abou
The uterus seemed to be held in position pretty well, howe
the cervix reappeared at the vulva. The organ seemed to sli
pubes, without retroversion of the body of the uterus. By
inflated ring pessary, the organ is kept in perfect position,
tion the only means of retaining it within the body was
tamponage with oakum. Before operating in this case I in
patient that I should not expect permanent results without
upon the perineum and vagina, which are so relaxed th
whatever to the uterus. Indeed, I believe the failure of t
prolapse of the hypertrophied vaginal walls, which drag the
In deference to the patient's wishes, the second operation
it must certainly be performed before any substantial and
gained.

The two remaining cases were of deep interest to me, as they show very clearly that anterior displacements may, in some instances, be corrected by this operation, as well as retro-displacements.

Miss M., aged twenty-one; had for several years suffered from sharp anteflexion combined with retroversion and prolapse of both ovaries and surrounding tissues. Uterus lay low as possible in the hollow of the sacrum. Obstinate constipation. Menstruation extremely painful.

Operation June 13th. Found the ligaments extremely small. Was able to withdraw only the right. It was secured in the usual manner. Wounds healed kindly. Stem pessary was painful, and could not be worn, so that flexion was corrected but slightly. Two weeks after the operation the uterus seemed to be as low as ever. Since that time the flexion has been gradually straightened by the dragging of the fundus forward, until it has almost disappeared. The ovaries are apparently in normal position. Menstruation is attended by little or no pain. The patient has gained much in flesh. When discharged to return home, a few weeks ago, was enjoying better health than for many years. This case, like that of Mrs. M., well illustrates the fact that even one ligament is sufficiently strong to sustain the weight of the uterus, and by continued traction to restore it to its normal position, even if the first effect of the operation may not be perfectly satisfactory in this regard.

Miss M., aged thirty-three; had been an invalid eight years; had been under medical care most of the time. Very weak and nervous, unable to be upon her feet any length of time, and incapable of exercise of any sort. Suffers with constant pain in pelvis, which is greatly increased at the menstrual period, particularly in the uterus and left ovary. Profuse leucorrhœa. Constant bearing-down, and great distress in lower abdomen when on her feet. On local examination, found complete anteversion with anteflexion in first degree. As all sorts of pessaries and other means of treatment had been employed without success, I determined to see what could be done with a case of this sort by Alexander's operation.

Found both ligaments, which were rather small in size. After freeing the ligaments from their attachments and before making traction upon them, I introduced one finger into the vagina, and placed it upon the fundus of the uterus, which lay under the pubes, while the cervix was in the hollow of the sacrum. With the finger of the right hand in this position, I made traction with my left hand on the two ligaments simultaneously. I felt the uterus dragged away from the finger of the right hand, it being lifted fully two inches upward and backward, where it was retained, the ligaments being secured over a lead or rubber plate, as in most of my cases. The wounds were closed in the usual manner. Since the operation the patient has been entirely relieved of the bearing-down pain from which she had previously suffered, even when lying in bed. She is able to be upon her feet all day, engaged in household duties, and is enjoying good health. I have seen her every week or two since the operation, and have never found the uterus in its old position. Indeed, the fundus seems to be gradually retreating upward and backward.

It seems to me that this case demonstrates not only the utility of Alexander's operation in cases of extreme anteversion, but also the erroneous character of the views which have hitherto been held, by some gynæcologists, in attributing anteversion to abnormal shortening of the round ligaments. Thomas gives shortening of the round ligaments as one of the causes of anteversion, and in speaking of the changes which occur in the uterine ligaments in cases of anteversion, he further states:—

"In anteversion the utero-sacral ligaments are generally shortened, and there is no doubt but the round ligaments are similarly altered."

The fact that the uterus was lifted bodily out of its abnormal position, and drawn backward to its normal position by the round ligaments, and that it was found neces-

sary to shorten the ligaments fully three inches, shows of abnormal shortness of the round ligaments, is an utte seem to demonstrate that shortening of the round ligam sion—at least, that a longer period than eight years is change of this sort.

It would seem that a consideration of the anatomi ments, the internal abdominal ring and the uterus, wou of the ability of the ligaments to raise the womb to its sibility of anteversion occurring as the result of shorteni which the round ligaments enter the inguinal canal, is ha pubes and the anterior superior spine of the crest of the of Poupart's ligament; so that, with the uterus in ante ments is calculated to restrain the organ from extreme see how extreme anteversion can occur without elonga case I have detailed shows that in at least one case of e was restored to nearly its normal position by shortening four inches.

My observations in the employment of Alexander's following conclusions:—

1. As to the indications for the operation, I beli advantage in four classes of cases:—

*a.* Cases of retroversion and retroflexion of th reasonable efforts for their relief by other rational m

*b.* Cases of procidentia, especially those in whi subinvolution of the uterus and vagina, provided a colporrhaphy, or both, shall also be performed when and perineum to do their duty in retaining the uter placed there by shortening of the ligaments.

*c.* Cases of anteflexion combined with retversio by prolapse of the ovaries.

*d.* Carefully selected cases of anteversion.

*e.* Cases of ovarian prolapse in which the ovaries I have not performed the operation for this last-name of the twenty-two cases upon which I have operat lapsed and tender, and generally one or both has bee case, however, the ovaries have been restored to thei exception of two cases they have been retained the to the determination that I shall employ the operati tion a displaced ovary when a case shall present its is indicated.

Slight adhesions, such as do not prevent the easy re sound, do not necessarily interdict the operation.

2. I have observed that in the cases of young women to vigorous physical exercise, the round ligaments are sl in the muscular element, while in women who have bet they are well developed, as in the case of the German g a retroversion by excessive lifting in doing a man's work emphasizes the necessity for making active muscular part of the education of girls as well as of boys.

3. I have also been struck by the fact that in some degree and long duration, in which I expected to find th uated, I have instead found them very much larger tha

to believe that various uterine displacements are sometimes due to hypertrophy of these ligaments, by which they are increased in length as well as in thickness. That such a hypertrophy does occur is recognized by Scanzoni and others. It may be the result of subinvolution after childbirth, or what may be termed a post-menstrual subinvolution from cold contracted at the menstrual period, or other causes by means of which the menstrual function is so deranged that the uterus and its appendages fail to return to their normal condition. After menstruation, the uterus being heavier, from congestion and subsequent overgrowth, and the normal ligaments elongated by the same causes, so that they permit the organ to make too great descent in its excursions in such muscular acts as coughing, lifting, defecation, etc., it is not marvelous that the top of the womb is finally tilted so far backward as to enter the current of downward action, and being engaged by the intestines above, it is forced backward into the hollow of the sacrum.

In watching the results of shortening of the round ligaments I have been led to the conclusion that the amputation of the outer extremities of the ligaments sets up a process of involution not only in the ligaments themselves, but also in the uterus and its other appendages, including the ovaries, just as involution of a subinvoluted uterus is often set up by an operation upon the cervix. This result, however, must be in part due to a restoration of the normal circulation by the changed position of the organs; but the process is so rapid, that it seems fair to suppose that the idea advanced has foundation in fact. The rapid decrease in size of the enlarged uterus and ovaries, as the result of this operation, has really astonished me. In a number of cases the uterus became in a few weeks after the operation actually less than average size. This peculiarity was independently noticed and remarked upon by an excellent gynæcologist who examined six of my cases within a few weeks after the operation.

4. My practice has been to draw the uterus close up to the anterior abdominal wall, or at least to make the ligaments taut. I at first apprehended some trouble from pressure upon the bladder, but this has not occurred in a single instance. The reason for this I understood after relieving a case of extreme anteversion by the same operation.

5. In order to determine the strength of the ligaments, one of my assistants, at my request, tested the outer three inches of a medium-sized ligament by tying a tin pail to one end and pouring water into the pail until it broke. When the weight reached 8 lbs. 3 oz., the ligament stretched about one-fourth of an inch and was then cut off by the ligature by which the pail was attached. This clearly shows that the round ligaments are strong enough to perform the work demanded of them, which is merely to hold the uterus forward out of the current of downward action, until the other natural supports of the organ can recover their normal tone, and thus insure permanent results.

6. I have found what seems to me to be marked advantages in a modification of the operation as described by Dr. Alexander and others. Instead of simply stitching the end of the ligament to the pillars of the ring or the edges of the wound, I, in addition, attach to the outer end of each ligament a silver wire. The two wires are brought together over a broad plate of hard rubber or sheet lead notched at either end to receive the ligaments. This removes all strain from the wound, and facilitates immediate union. Further than this, this method provides against the escape of the shortened ligaments into the abdominal cavity, in case the wound fails to close by first intention, as happened to a surgeon of my acquaintance, causing a total failure of the operation. Indeed, it may be easily supposed that the condition of a woman with detached round ligaments, would be worse than before the operation.

7. As regards the danger of the operation, the total number of cases operated upon must have reached at the present time nearly three hundred, among which I have been able to learn of only four fatal cases. I can understand that a bungling or careless

operator might easily do much damage in undertaking this operation, but with scrupulous attention to asepsis and delicate and careful manipulation of the tissues, the operation seems to me to be an eminently safe one. In only one of my cases, a very hysterical patient, did the temperature rise to 103° for a few hours. In two others, the highest temperature was 101° Fahr. Of the rest the temperature scarcely reached 100° Fahr. in any, and in several cases was less than a degree above normal at any time. With the greater skill gained by further experience, I hope to be able to prevent even this small elevation of temperature. The suffering from the operation is slight. Patients very rarely require an anodyne of any sort.

8. And, finally, as regards the advantages of this operation over the use of pessaries, it seems to me there is everything to be said. Of 643 cases of uterine displacement treated by Dr. Mundé and other gynæcologists of equal standing, only eight were reported as cured by pessaries. I have the records of over two thousand cases treated within the last twelve years by myself and my assistants, in which I have endeavored to employ all the efficient remedial agents known to the profession, but failed to effect a radical cure in more than four per cent. of the cases. A pessary cannot cure a displaced uterus any more than the use of a crutch can cure a weak or paralyzed leg, only under very exceptionally favorable circumstances, as in recent cases of subinvolution, or in cases of recent displacement from mechanical injury of some sort. As a rule, the pessary, when once adopted, becomes a life-long necessity, and to many women a life-long burden and an intolerable nuisance. The pessary will always have its legitimate use; but I believe that an appreciation by the profession of the benefits to be derived from Alexander's operation will greatly limit the use of the pessary, and will relieve a vast number of suffering women from an onerous burden.

The recognition of the fact that the round ligaments are largely muscular in their structure, and not mere fibrous bands, must greatly weaken the faith of the profession in the methods of treating uterine displacements heretofore in vogue. It is quite singular, indeed, that we should have been so slow in discovering this fact regarding the uterine ligaments, which seems to have been known to charlatans who have been curing uterine displacements with electricity for half a score of years, and has been in Sweden for half a century well-known to the followers of Ling, who have treated uterine displacements with great success by a scientific system of gymnastics, including so-called pelvic massage. Dr. Apostoli, to whom is due the honor of placing the use of electricity in gynæcology upon a thoroughly scientific basis, has achieved brilliant successes with this agent. I have been using faradism in essentially the same manner recommended by him for several years, and with excellent results in favorable cases; but I have never been able to produce appreciable results in cases in which the relaxation of the muscular tissues had existed so long that fatty degeneration had taken place, or in which they had been so overstretched in a rectocele or a cystocele as to rupture the muscular fibres. Dr. Apostoli's method must take a prominent place in the treatment of uterine displacements; but it seems to me that there is large room yet left for surgical procedures and for Alexander's operation. Nothing could be more appropriate than the use of faradism in conjunction with the method of Alexander. It could hardly be expected that faradism would, in cases of retroversion, lift the intestines out of their abnormal position between the uterus and the bladder and restore the uterus to its rightful position in the pelvic cavity, but when this has been accomplished by Alexander's operation, then we may welcome all other means which will restore and strengthen the internal and external muscles which act a part in holding the uterus in its normal place among the abdominal and pelvic viscera.

DISCUSSION.

Dr. E. H. TRENHOLME, of Montreal, said he regretted not being able to endorse the eulogistic and eloquent remarks of the reader of the paper. He said he hardly knew how to take up the subject, in view of the fact that women in Canada did not seem to be made in the same way as in this great country to which we were so near akin. His own experience of the operation had not been a flattering one, and this he coupled with the fact that one able medical man who conducted the anatomy room of one of our colleges had found that in twenty-seven dissections the round ligament was absent in eight cases. If, upon further examination so large, or even a smaller proportion be found, he said that a most damaging blow would be struck against the future of this operation. Moreover, he believed the field for operation would be greatly limited if uterine displacements were treated upon the preventive plan so ably proposed by Dr. Graily Hewitt. There could be no doubt that much uterine disease could be prevented if attention were given to the general health and special needs of the young girl. We could do much by rest, and it was noticeable in the papers read, how much stress was laid upon months of rest before and after the operation, also the use of pessaries. We all know the immense value of rest and other treatment, and we could doubtless each report many cases thus cured. The value of topical treatment to the os, in cases of prolapsus of the mucous membrane, and lacerations of the cervix, is very great indeed. Perhaps something in the way suggested by Dr. Bozeman for the urethra, might be done for the prolapsed mucous membrane of the cervix. Eversions of the cervix, whether due to lacerations or prolapsus of the mucous membrane, were important, and called for treatment.

The fact of the uterus being an erectile organ should not be lost sight of. It was well known that the amputation of even a small portion of the penis caused rapid and extensive shrinking of the organ. The same was true in removals of even small parts of the cervix. In Emmet's operation, how often was the uterus restored to its normal size and weight. Even where the local surgical treatment is confined to the everted mucous membrane great benefit results. We must not overlook the importance of local depletion by tampons, etc.

In conclusion, he deprecated the frequent resort to the operation, and urged upon all, before they undertook it, to satisfy their consciences as well as their judgment that they were justified in so doing.

Dr. AUGUSTUS P. CLARKE, Cambridge, Mass.—In discussing Alexander's operation of shortening the round ligaments for uterine displacements, I shall confine my remarks to my experience in two cases. The first case in which the operation was performed, retroversion and prolapse were the cause of much inconvenience and suffering, and could only partially be relieved by the use of pessaries and other means of treatment. There was no laceration of the perineum, though the patient was a multipara. She was of a strong and wiry constitution and not overburdened with fatty tissue. No serious difficulty was encountered in finding the round ligaments. These were isolated and stitched to the pillars of the abdominal ring. After the operation the patient was kept in bed for six weeks. She then wore a properly adjusted pessary for upward of a year. Since that time she has not experienced any symptoms of uterine displacement, and she now considers herself as cured.

The other case was one in which Dr. Henry O. Marcy, of Boston, operated. Scrupulous attention to every detail in the operation, and subsequent rest of the patient, brought about a favorable result.

In regard to finding the round ligaments, experience teaches that much care and

patience must be exercised, lest dissection be carried at first too near the abdominal ring, and violence be done to the numerous subdivisions of the ligament which occur just after it emerges from the inguinal canal.

This operation should only be undertaken after all other simpler measures have failed. Shortening of the round ligaments draws the anterior surface of the uterus toward the abdominal parietes, and thus overcomes retroversion.

Professor DOLERIS, of Paris—The speaker treats cases of retroversion of the uterus by shortening the round ligaments where all other measures have failed. Where there is retroflexion, he first overcomes the flexion by three or four forcible dilatations, and then shortens the round ligaments. In cases of prolapse, he first restores the uterus to a normal condition. If the cervix is abnormally long, it is amputated, and the round ligaments are then shortened. Anterior and posterior colporrhaphy are also performed. In cases of anteversion, there is no need to shorten the round ligaments, as the pressure of the abdominal contents does not come upon the uterus, as in the case of retroversion. In these cases the vaginal operation is sufficient. The object of the shortening of the round ligaments is not to suspend the uterus, but to antevert it.

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Dr. JOSEPH TABER JOHNSON, of Washington, D. C., read a paper—

## ON THE TREATMENT OF THREATENED PERITONITIS, FOLLOWING LAPAROTOMY, BY BRISK PURGATION.

### TRAITEMENT DE PÉRITONITE IMMINENTE APRÈS LA LAPAROTOMIE PAR PURGATION ACTIVE.

### DIE BEHANDLUNG DROHENDER PERITONITIS IN FOLGE VON LAPAROTOMIE DURCH STARKE PURGANTIEN.

In the month of February, 1885, I stumbled upon a mode of treatment, in a case of the green and bilious vomiting of commencing peritonitis following laparotomy for the removal of the uterine appendages, which greatly surprised me.

My patient had vomited at first from the effects of ether, but it was not arrested; and on the third and fourth days it grew worse; with it she had a pulse of 112, a temperature of 102°, considerable abdominal tenderness and distention.

On the evening of the fourth day after the operation, everything else having failed, and as the patient was growing worse, I resolved to administer small and repeated doses of calomel. I ordered five grains divided into twenty powders, with directions that she take one every half-hour until relieved.

The last part of the direction was either misunderstood or disregarded by the nurse, and all the powders were given; the first four or five were vomited, but the others were retained.

Later on the bowels began to move, the vomiting stopped, the pulse and temperature went down below 100, the tenderness disappeared and the patient recovered, and is thoroughly well and happy to-day.

Before having occasion to put this treatment to the test in another similar case, I saw that Mr. Lawson Tait was recommending brisk purgation for just this condition,

and that he gave a very reasonable explanation of its mode of action. In the *British Medical Journal* for May, 1886, p. 921, Mr. Tait refers to the statement of Baker Brown that "it was the peritonitis that beat us in these cases:" "now," says Tait, "we beat the peritonitis; on the slightest indication of peritonitis after an ovariotomy we give a rapidly acting purgative; it matters not what; the patient's bowels are moved and the peritonitis disappears."

We were formerly taught, and not a few, I believe, practice those teachings to-day, that it was necessary to keep the bowels religiously bound up from seven to nine days after an ovariotomy, and that, to accomplish this, repeated doses of opium in some form were required.

It was argued that the opium was of double value in thus locking up the bowels and allaying pain. This locking up of the bowels and other secretions also, it seems to me, is productive of much harm, inasmuch as the peristaltic movement of the intestines is thereby prevented, adhesions are thus allowed to form more easily to the stump, abdominal wall, or to torn surfaces from which the tumor has been removed. Gases collect and distend the intestines and the abdomen, causing much pain and discomfort. Fatal obstruction of the bowels may, and I believe does, occur as a result of this treatment.

Dr. Gill Wylie, of New York, has recently been purging his laparotomy patients early, but he claims for a different reason than stated by Mr. Tait.

Dr. Wylie believes that many cases die after laparotomy on account of intestinal obstruction. Upon the first evidence of its occurrence, he endeavors to break it up by increasing peristalsis, and claims that, although he received a hint from Mr. Tait upon the subject last summer, he has been giving the same remedies, but for a different purpose and upon a different principle.

Speaking of drainage after ovariotomy, Mr. Tait, in his book on "Diseases of the Ovaries," 4th edition, 1883, p. 315, says, "I believe that a tube (glass) placed in a healthy peritoneum could be made to drain away an indefinite quantity, for there is no doubt that the peritoneum, being a huge lymph sac, is constantly passing lymph either through the intestines outward, or from the outer wall in toward the intestines.

"The fact that I have been so successful in my own operations without drainage, makes me think it probable that I have unconsciously substituted purgation for drainage, for, on looking over my records, I find that, in very many of the cases where Dr. Keith would have drained, I have purged; this would seem as if the intestines were to a large extent the outlets of the drainage stream."

It has been lately asserted that collections of serum in the abdominal cavity in commencing peritonitis are either removed by the endosmotic action provoked by saline purgatives through the intestines, or that a sufficient stimulus is given to the hungry absorbents, suddenly deprived of their fluids, to cause its absorption.

It matters not, so far as the life of the patient is concerned, which of these theories is correct, or, indeed, whether either of them are, so long as death is prevented by the use of brisk and thorough purgation, when menaced by a rapidly increasing peritonitis.

In three cases narrated below I am very sure that their lives were saved by calomel and Rochelle salts, when marked evidences of peritonitis were already present, such, for example, as more or less constant green and bilious vomiting, distention of the abdomen, elevation of pulse and temperature.

I operated on Miss B. for the removal of a dermoid cyst from the left ovary on February 5th, 1886. The other ovary was found to be cystic, and I removed that also. The patient rallied perfectly from the operation and did well for two days, when abdominal distention just below the ensiform cartilage occurred, the pulse became faster and vomiting was a troublesome feature of her case.

Nothing I did gave her any relief, and her symptoms growing rapidly worse, I ordered calomel and Rochelle salts. As soon as her bowels were thoroughly moved, the unfavorable symptoms all disappeared, and she went on rapidly to perfect recovery.

In November, 1886, I removed from Mrs. W. a large ovarian tumor with a twisted pedicle. She had had peritonitis, and a week before the operation had been given over to die.

The walls of the tumor were nearly black, very friable, and tore in various places in the process of removal; there were recent adhesions everywhere, and its contents a dark red, from the rupture of vessels and extravasation of blood into its cavity.

After the complete removal of this tumor, the thorough cleansing of the abdominal cavity, suturing and dressing the wound, this very weak old lady was put to bed more dead than alive, with an unfavorable prognosis from all the physicians present.

She went through the same experience as the case just narrated—pulse, temperature elevated, great abdominal distention and constant vomiting, gave token of her speedy death. The calomel and Rochelle salts saved her life, I fully believe; I ordered them on the evening of the third day, and the bowels were moved very freely. The vomiting stopped. Peristalsis was reversed, the other symptoms disappeared. She got completely well, and left the hospital three weeks after the operation. She is to-day keeping a boarding house, to the great surprise of her family and friends.

In still another case, where the appendages had been removed to check the growth and the terrible hemorrhages of a uterine myoma, the vomiting became a very constant and troublesome symptom, nourishment was thereby prevented, the pulse became weak, small and rapid, gases collected, producing pain and distention.

Dr. Franzoni, her physician, who kindly sent her to me, thought the prognosis very unfavorable. The calomel and Rochelle salts purged away all her symptoms and she made a beautiful recovery, and has since had no return of her hemorrhages.

In two other cases within the past six months, the effects of saline purgatives, aided in one case by the rectal tube and a little calomel, and in the other by a turpentine enema, cleared away troublesome and alarming conditions.

In my last sixteen ovarian operations I have not lost a case, and I feel confident that at least three, if not more, of them would have died but for the effects of the saline purgatives prescribed within three days after their operations.

I was pleased to notice that the latest authority on abdominal surgery, just republished in this country, Dr. Greig Smith, very emphatically recommends the treatment above advocated by me in similar cases.

While no pretence is made that there is anything very new or original in this mode of treatment, still, it has been so successful in my hands that I have ventured to mention it here, and suggest to others, who have not yet given it a trial, that it is well worthy of their consideration.

## DISCUSSION.

Dr. GORDON, of Portland, Me. :—I wish to emphasize the point made by Dr. Johnson in regard to the use of purgatives in the beginning of peritonitis and cellulitis. During the present year I have followed this method with marked success. We often find after laparotomies that high temperature and vomiting commence on the first or second day, and may continue to a fatal result. I have always taught that inflammation is a short and destructive process, and that our principal treatment should be to prevent evil results, by the disposal of the exudate, so as to avoid suppuration or organization. To do this, I have advised the early use of brisk purgation to empty the overloaded vessels, so that they shall be in condition to promote absorption as rapidly as possible. The anticipating the result by giving the salines in the beginning of the inflammatory process will, I think, be an improvement. All

of us use leeches in localized inflammation as early as we can, with a view to relieve the congested vessels. The peritoneum is no exception to the general rule, and the result must be similar when the vessels are unloaded by salines and other cathartics. I think we have been too long held by the teachings of Alonzo Clark, who kept the peritoneum in his famous "opium splint."

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Dr. E. W. CUSHING, of Boston, Mass., read a paper—

## ON CANCEROUS DEGENERATION OF HYPERPLASTIC GLANDS OF THE CERVIX UTERI.

### SUR LA DÉGÉNÉRATION CANCÉREUSE DES GLANDES HYPERPLASTIQUES DU COL DE L'UTÉRUS.

### ÜBER CARCINOMATÖSE DEGENERATION HYPERPLASTISCHER DRÜSEN DES CERVIX UTERI.

At the meeting of the American Medical Association in 1886, and later and more fully before the Connecticut State Medical Society, I have called attention to the views of Ruge and Veit concerning the true nature of "erosions" of the portio vaginalis cervicis.

It is now generally conceded that these eminent observers are quite right in attributing the greatest importance to the glandular hyperplasia, which is really the most important anatomical change underlying the condition of erosion or ulceration so called.

In investigating the subject of cancerous affections of the cervix, however, Ruge and Veit have described a condition or change of the glands which they consider to be in itself of the nature of cancer, a transition from innocent to malignant new formation. This explanation of pathological changes, which certainly do occur as they describe them, seems to me to be much less clearly demonstrable than the view which they maintain concerning the nature of erosions.

Briefly, they attribute the greatest importance to a certain filling up of the lumina of the glands with epithelial cells, either columnar, corresponding to the natural lining of the glands, or flat, with one or more nuclei.

They give figures showing how solid processes of epithelium, undoubtedly cancerous, are found side by side with glands more or less completely occluded by the proliferation of the epithelia, and they draw the inference that the undoubted cancer originated directly in the solidified glands, and that the latter represent an early stage in the development of the cancer, a transition. This fascinating theory agrees so well with the views and theories of Thiersch and Waldeyer and their followers, that it has been very widely accepted, and a plate showing the transition is given in Dr. A. Martin's admirable handbook of Gynæcology.

Nevertheless, I think it probable that greater importance has been attached to this condition of the glands than is warranted by any facts thus far demonstrated.

In the first place, as Ruge and Veit expressly declare, in the vast majority of the cases examined by them the carcinoma did not originate in the new-formed glands, but infiltrated the cervix as a "carcino-sarcoma," an aggregation of small cells lying in

masses, more or less completely separated by partitions of connective tissue. In such cases there was no evident connection with the epithelium of the surface nor with the glands. In four out of twenty-two cases of incipient cancer of the cervix, however, they found appearances of solidification of the glands, and filling up of their lumina with epithelium, which they describe and figure as a transitional stage in the development of the cancer, which was adjacent.

Of course, it is permissible, while accepting the strict accuracy of the description and drawings of these observers, to explain the phenomena described by them in another manner, and with much diffidence I venture to suggest that my studies of the changes in question have led me to different conclusions from those of Ruge and Veit.

As it is my custom, in all cases of lacerated and eroded cervices, to remove the diseased tissue pretty thoroughly, and to examine the specimen microscopically, I have found a number of incipient cancers. I have prepared photo-micrographs of two of these and of one doubtful case, all showing the condition of the new glands described by Ruge and Veit. But I have also found in various cases, where there was no suspicion of cancer, a precisely similar filling up of the glands with epithelial elements, so that I have been led to conclude that this is not characteristic of cancer, but that it is merely a reaction of the glandular tissues to what we in ignorance call an irritation, a sort of perverted growth of the glands which undoubtedly occurs in the neighborhood of cancers, and undoubtedly is an early symptom of cancerous affection, but in itself is not necessarily cancerous at all.

The question is of practical importance in regard to the microscopic diagnosis of suspicious affections of the cervix, for, as it is admitted that the diagnosis cannot be made securely by the unaided eye nor by the touch, and as vaginal hysterectomy is now advocated, and, at any rate, free amputation of the portio vaginalis is indicated in all cases of undoubted cancer, even in an incipient stage, a great responsibility is thrown on the microscopic examination.

It is not a mere abstruse point of pathology; it comes home to every conscientious gynæcologist, for on the decision of the microscope rests his advice and his action.

Case N. H. shows how difficult the decision may be—diagnosticated as cancer by the eye and touch—forty-nine years old; glands filled up; small cell infiltration; broken line of epithelium papillary projections. Is it a cancer? We can only say that it was likely to become so, not that it is so already, by any safe microscopic landmarks.

And here it is right to call attention to the difficulty of stating in any given case that the lumen of a gland is filled up with flat epithelial cells. The plates of Ruge and Veit are not conclusive on this point. If a gland is lined with large cylindrical cells with well-stained long nuclei, and then a cut is made which cuts these cells crosswise or lays bare their free ends, we get a picture of flat epithelium which is very deceptive, and, with less experienced observers than Ruge and Veit liable to lead to great error. Even when a whole series of glands lying adjacent to each other show occluded lumina on section, I cannot feel that the diagnosis of carcinoma is justified, but only that of adenoma—an adenoma which may become destructive, but is not carcinomatous until changes occur in the connective tissues between the glands, until the boundaries of the glands are broken through by the growing cells, and the proliferation and collection in alveoli occur free in the stroma of the organ apart from the glands. Even when the new glands are thus manifestly involved in the carcinomatous growth, it has seemed to me that they are invaded from without by the growth of cells in the surrounding tissue. I have not found any evidence that, after filling up the lumen of a gland, the proliferating columnar epithelium changes to the flat variety and, breaking through the boundary of the gland, invades the surrounding tissue.

Moreover, in attributing so much importance to the fact that they found the lumina

of some of the new glands occluded, Ruge and Veit have not noticed the explanation that precisely these solid acini or branches may be the first stage of their existence previous to the formation of the lumen. Such a mode of growth is seen in the formation of new glands in the walls of a multilocular cystoma of the ovary. These little solid sprouts, lined with columnar epithelium, afterward become hollow and then dilate, forming cysts. A similar mode of growth is seen in the female breast when rapidly enlarging preparatory to the secretion of milk.

Shall we then say that a case is not cancerous which shows no distinct structure of carcinoma on microscopic section; only a glandular hypertrophy with some of the glands filled with epithelium and the stroma infiltrated with small cells, the surface irregular and denuded of its epithelial layer? It is not safe so to say. For these are the very cases which, occurring in cervices amputated from women of fifty or over, with old lacerations and erosions of the os uteri, are precisely similar to others which, neglected, become eventually cancerous. Just here we find that the Thiersch-Waldeyer theory of the epithelial origin of carcinoma fails entirely. In just these cases is it impossible to find the transition from the hypertrophic glands to the cancer. The glands are there; if the case has gone far enough, the carcinoma may be just beyond; but I cannot find a case where the latter arises from the solidified glands by a transition or a development and spread of the process of solidification. Neither does it arise by an inward growth of the epithelial pockets which project down between the sprouting papillæ.

On the contrary, the carcinoma develops among a cloud of infiltrated small cells. They collect in masses, while the connective tissue is pushed apart or arranges itself in bands or alveolar boundaries. The connective tissue is manifestly "irritated;" it is full of small cells, it takes the stain strongly.

Then the carcinomatous process spreads inward and outward, involving and invading the newly formed glands, eating up first a part and then the whole of each by an infiltrating cloud of cells, which are small, round, and by no means of the flat epithelial type which can be seen where the carcinomatous development has proceeded further.

What have we here? The mind reverts at once to the miasmatic infection of the older writers, to the unknown impulse of Ruge and Veit, who have so clearly described the difficulties in the way of the acceptance of the epithelial theory in cases of carcino-sarcoma of the cervix.

May we not reconcile the long contest between the two theories, which assign the origin of cancer, respectively, to the connective tissue and to the epithelial layer of the glands of the organ involved, by supposing that the anatomical arrangement of cells, which clinically and microscopically we call cancer, is only the outward and visible sign of a morbific agent at present hidden from us?

Whether there is a mass of small cells and we speak of sarcoma, or whether there are sprouting processes of large epithelial cells which we call carcinoma; whether the cells are alike or varied, large or small, neither of these facts constitute the real nature of the cancer. Its prevalence in certain families, its malignity, its tendency to necrosis, its power of metastasis, its infection of neighboring parts, its rapid sapping of the vital powers, its vile and peculiar smell when exposed to the surface and decomposing, all these and various other properties point to a class and nature of malady which our present knowledge and mode of regarding disease will not permit us to explain by dislocated fragments of epiblast accidentally included in the fœtal tissues, or by any of the other hypotheses by which the ardent supporters of Thiersch and Waldeyer have attempted to fortify their assertion that every epithelial cell must be derived from some previous epithelial cell.

In studying these and many other specimens of carcinoma of the cervix, I cannot avoid recalling the time when, sixteen years ago, I was making sections of tissues show-

ing the lesions of tubercle, syphilis and lepra, and wondering why they were all so similar, and so like sarcoma, viz., a cloud of small cells with some large "epithelioid" cells. Now we understand better the morbific agent in the first three of the above maladies, shall we not learn to separate the anatomical evidence of disease from the disease itself? If we see a charred and splintered tree, we infer the action of the lightning; if we see a lung solidified by pneumonia or tubercle, we infer the presence of the causative agent of those diseases. Shall we continue, in cancer, to suppose that we have only some exaggerated or depraved action of the normal tissues, or shall we infer that this also is a disease of infection, a germ disease, like leprosy or rhinoscleroma? In 1878 Ruge and Veit wrote:—

"If we sum up in a few words the result of histological investigation concerning cancer of the portio vaginalis we have here, precisely in the spot where chancroid most commonly occurs, most frequently observed the origin of the latter from connective tissue. Cancer of the uterus can grow gradually in an altered portio, or it arises in and from a cauliflower excrescence.

"A second possibility of its origin is from the epithelium of the glands; this is the glandular form. The epithelial origin, in the narrower sense, the development of cancer from the surface epithelium with its epithelial cells, we could never observe with certainty.

"As is especially evident in glandular cancers, carcinoma owes its real origin to an irritation, to an impulse, the nature of which is unknown to us.

"*It is possible that cancer, like tuberculosis, will some day be attributed to germs.*

"*Epithelial processes are not the beginnings of cancer.*"

I do not, of course, claim that this can be demonstrated at present; perhaps no specific bacterium can be found with our present appliances. Nevertheless, we must have some way of regarding this important question, and I think that we are too much under the influence of a cellular pathology, which regards the changes in the tissues so closely that it is in danger of ignoring the fact that the result of disease is not the disease itself.

The practical deductions which depend on our speculative opinions as to the nature of cancer are of the greatest importance. In the first place, if the disease comes from within, if it is a perverted growth of a part of the tissues, dependent on some original error of development, it is necessarily absurd to try to find empirically any medicine which should cure it. Nevertheless, new methods and new medicines are continually coming up, futile, as a rule, it is true. If, however, the disease is an infection of some kind from without, we are justified in trying empirically, if as yet vainly, for some remedy which may overcome it. Of more practical importance is the question of the utility of cauterizing the stump or cavity from which a cancer has been removed.

There is a very considerable amount of evidence going to show that surgical interference with a cancer is sometimes followed by a recrudescence of the disease, more rapid and violent than the original disorder. If we consider that the operation opens veins and lymphatics, which sometimes become infected with the morbific agent of cancer, just as acute tuberculosis sometimes comes on after operations around a tuberculous joint, we can better understand why a thorough cautery of the tissues left bare by the removal of a cancer of the cervix should be apparently so useful in lessening the chances of the return of the disease.

Did time suffice, I could trace out many other points in which the theory of an infection fits better with the clinical history of cancer than any other. At present I can only say, limiting myself to the cancerous degeneration of hypertrophic glands of the os uteri, that I cannot find that the glands pass by direct transition into a cancerous degeneration. That the glandular hypertrophy precedes and accompanies the inception of cancer of the cervix, and in such cases every gland seems to be a focus of

intense local excitement, with infiltration of small cells in the neighborhood. That cancer of the cervix occurs almost exclusively in women who have borne children, and, as far as observations go, very largely in those who have long suffered from glandular degeneration of the portio vaginalis cervicis. That we are therefore justified in considering the newly formed glands as *the road* through which the cancerous infection usually enters the tissues, and we are required and obliged to attempt to cure or remove glandular degeneration of the portio. That all suspicious cases of erosions of the cervix should be early submitted to microscopical examination, by excision of a small wedge of tissue, a proceeding which, under cocaine, is neither painful nor difficult. That where the microscope shows glandular degeneration, the surface bare of epithelium, the tissues densely infiltrated with small cells, especially if the woman be fifty or over, we should not say that the microscope only shows chronic inflammation, but that *while cancer is not proved, it is not excluded.* And we should recommend a free removal or destruction of the suspected tissue.

## DISCUSSION.

### TWO CASES ILLUSTRATING CERVICAL DEGENERATION, WITH REMARKS BY JAMES K. KING, M. D., CLIFTON SPRINGS, NEW YORK.

I would also like to refer to a few points in Dr. Cushing's paper on the "Malignant Degeneration of Glandular Hyperplasia of the Uterus." The facts and illustrations he has presented seem to me to be of great importance and should be fully recognized by every medical man. Let me illustrate this point. In 1881 a lady came under my care for uterine disease. She had cervical laceration accompanied by extensive erosion. I was not then operating much. I healed the eroded surfaces by topical applications, and she returned home. Early in 1884 she came to me again, and the condition was rather worse than before. I did not like the appearance of the lips of the cervix. I was just then starting for Europe, and advised her to go to a good surgeon and have the laceration repaired. She did not follow my advice, however. In 1887, three years later, I saw her again, but it was too late to operate with any hope of success. The uterus and periuterine structures were all involved in cancerous degeneration. This was a serious and instructive lesson to me. I have now a lady under my care who has had the same experience as the case related up to the time of her second visit to me. The cervical lips look angry and unhealthy. I shall operate as soon as I return home, removing more than the usual amount of tissue necessary to repair the edges in order to leave no degenerated structure. I would not have you understand me, gentlemen, as advocating that all, and especially slight, lacerations of the cervix should be repaired, but I do urge upon you that, whenever there is extensive and persistent erosion with tendency to return, you watch closely the indications of degeneration. For I am certain, from the cases I have related to you, and many similar ones, that lacerations and erosions do, from constant irritation, degenerate into malignant disease.

Dr. A. CORDES, Geneva, Switzerland, read a paper on—

## MEDICAL TOPICAL TREATMENT OF CANCER OF THE UTERUS.

### TRAITEMENT MÉDICAL LOCAL DU CANCER DE L'UTÉRUS.

### MEDICINISCHE ÖRTLICHE BEHANDLUNG DES UTERUSKREBSES.

If I were desirous of making a criticism of that great operation, vaginal hysterectomy, which, although newly born, has rendered such eminent services and retarded death in so many cases, I would not choose America, this newly-born and lively country, in which the word impossible is next to unknown to surgeons, in which to make such a communication. Quite the reverse, if I am bound to speak *aperto cordi*, I must confess that, in our country we are too timid, we are not, with a few exceptions, courageous enough to try to do some good, for fear of doing harm.

Up to the present, dear American confrères, we have let you make the first steps in the way of progress and scientific boldness, being satisfied if we can follow you, as Julius followed Æneas, "*non passibus acquis*," in the paths that you have trodden.

This timidity is the very one reason why I could not select as my subject of to-day's paper one of those brilliant operations which you have the secret of performing with success, and of which we leave to you the monopoly, in my opinion, too much uncontested.

Dazzled by the successes obtained by total hysterectomy, which removed the whole diseased organ, some have, I believe, too much abandoned the medical topical treatment of the uterine cancer, which gives less striking results, but safer and more durable, it may be, in some cases. To that treatment I wish to be allowed to call your attention for a few minutes. It has given, and will certainly continue to give, good results in retarding the course of the disease. It must be used in the very common cases where the total extirpation cannot be attempted or resorted to.

In his "Harveian Lectures" (London *Lancet*, Vol. I, 1837, p. 359), John Williams says that 72 per cent. of the women operated upon by the vagina recover from the operation (Schröder's statistics). Rochelot had five deaths out of eleven operations; four died from the operation, the fifth one died five months after; the first was operated on nine months ago. (*Soc. Chir.*, March 7th, 1887, *Review Med.* for 1887, p. 225). In statistics given by Davelius, (*Phil. Med. Times*, May 27th, 1880, p. 122), out of 29 cases of total hysterectomy, about one-half died in one year, one-fourth lived after two years. Out of 83 treated by partial extirpation 45 remained well at the end of one year. "Observations for five years did not greatly modify this proportion." Out of 40 cases of total extirpation, Schröder says the cancer returned 15 times in the first year and seven times in the second (Williams, p. 360). Thus, indeed, lies the question: When we have removed the cancerous uterus all is not done. We have done away with a local focus of infection and have not secured any permanent benefit for the patient, for the diathesis still remains, ready to show itself elsewhere, or to relapse *in situ*.

No doubt this relapse begins, as a rule, in the mucous membrane, as observed by Rochelot (p. 220, *Rev. Med.* f. 1887; *Soc. Chir.*, March 9th, 1887). Some method taking this into account should be adopted; curetting—for instance—gives to the operator a better chance. It has been said that in the external cancer, the ablation of the diseased organ gives an active impulse to the disease. I do not believe it; for if this were true, I would never amputate a cancerous breast. Our duty is to limit the disease as much as we can, to moderate its overrunning course, to fight against its dangerous symptoms, to resist the auto-infection to which the patient is liable from the fact that she is cancerous, to brace up her system so as to enable her to afford the expense of her disease and to withstand it.

Twice only in history have the ancients appeared to use any active therapeutics for this awful malady. I will mention only Hippocrates and Celsus.

*Hippocrates* (Vol. VII, p. 347, Sec. 31) commends the use, as an enema, of the inside of a pumpkin (courge), crushed, and mixed with honey; in another passage he prescribes a cucumber used in the same way.

*Celsus* seems to have known the cancer of the cervix only; he names it *mushroom ulcer* and treats it with the scales falling from hot copper when struck with the hammer; with *Myrtus's* cerate; then with the hot iron, and the chemical caustics. This is certainly progress.

In fact, we are usually not called until the disease has so far progressed that removal of the diseased parts is almost impossible; the ganglia, the parametric tissues, the vagina, the neighboring organs, included (J. Williams, *loc. cit.*) and adhering to each other or matted together. It is only exceptionally that a woman consults us for a beginning cancer of the uterus. Indeed, the symptoms of the beginning cancer of the uterus are very obscure. Dr. Bouilly, who has lately (Dec., 1886) published a lecture on the precocious diagnosis of cancer, did not throw much light on the subject. I may say the same of Schak (*Zeitsch. f. Geb. und Gyn.*, Bd. XIII, Heft. 1). Prof. Palmer, in his "Early Diagnosis of Cancer Uteri" (*American Archives of Gyn.*, Dec., 1886, p. 992, and May, 1887, p. 148), says, "If the disease is malignant, the improvement under treatment will be very slight, if any." "The microscope will early reveal the character of the disease."

The diagnosis is often too uncertain to warrant us to propose a dangerous operation. I will soon mention such a case. To make the diagnosis more certain, we can, it is true, examine microscopically a piece removed from the uterus. But, often enough, the pathologists do not agree on the nature of a specimen under their eyes. Moreover, the wound occasioned by the removal of a very small portion for examination is not disposed to heal in a case of cancer, but will enlarge and be the origin of ulceration, spreading rapidly and seeming to give a new activity to the disease; so much so that operation is needed in a very short time. Such is the opinion of the Professor of Gynæcology in Geneva.

In July, 1886, I found, when taking the wards of the *Maternité*, a patient (who was one of the subjects given to the competitors, and whom I cannot, for this reason, forget) presenting ambiguous symptoms. The opinions of a good many physicians to whom I showed her were widely different. The Professor was rather affirmative for a cancer; for this reason he was deterred from taking a piece of the uterus to be examined, for fear of being obliged to operate at once; he spoke of cervical amputation. R. Barnes and H. Bennet thought that it was carcinoma; I, however, thought not, therefore I kept her in the wards four months without any active treatment. I applied only iodized glycerine, which caused the size of the cervix and uterus to diminish much. This patient left the hospital, believing herself cured, in the course of November. She came to me as a private patient, being no worse. I meet her from time to time—she suffers only from menstrual discharge, rather profuse. She will, no doubt, come again; we shall then see what has to be done for her (when last seen, August 13th, the uterus was six and three-fourths inches long, cervix hard, no hemorrhage). She was perfectly operable; the uterus was movable, the parametric tissue was quite free; hysterectomy would have been relatively easy. But could any one say we have been imprudent not to remove a uterus perhaps affected only by metritis?

The great majority of cancerous women do not come to consult a doctor or specialist before the cancer, which begins almost always at the cervix (95 per cent., after Deverney, p. 8) and is painless during the first months, becomes painful and causes fetid or profuse discharges.

The preference of the epithelioma for the cervix is explained by some, Breisky among them (*Wien. Med. Wochensh.*, 1876, Nos. 49–51), by the friction of the cervix on the vaginal floor.

As long as the discharges are not very abundant, and almost cancerous; as long as they preserve a kind of periodicity or regularity, the women mistake them for their *periods*. The women, indeed, persistently call every bloody discharge, more or less pure, a period—*periodes naturales*. When questioned, they almost invariably answer, "I am very much better, menstruated regularly for four months. Slight show every fortnight, but the periods last longer."

A means of distinguishing the *menstruæ* from accidental or pathological discharges, which helped me in some cases, is the existence of an alternative motion of occlusion and gaping of the vulvar orifice, quite similar to the one you may observe in the mare when in heat, and which does not exist except during the period.

Pain does not begin, in most cases, before the cancer has encroached on the peritoneum and neighboring organs, and before the menses have undergone the hypergenesis of the cellular tissue and the partial degeneration of some nervous tubes, described by Cornil (*Anat.*, 1861), and before the cancerous growth has penetrated the neurilemma, as Broca noticed it (*Soc. Anat.*, 1864, Romien, p. 8).

Oftentimes, the offensive smell of the discharges brings the patient to the physician; but the smell comes very late, for the fetor shows a degenerative ulceration, and at that period the neighboring tissues have been already invaded. The rosy or reddish discharge which comes at first after copulation, or any shock, or unusual exertion, or after taking injections, is imputed by the patient to venereal orgasm, or to the material stroke undergone by the womb. It does not, as a rule, fix her attention unless it becomes frequent, profuse or almost continuous. For the women who take some care of their persons, make frequent injections, and do not notice, being in the dark dressing-room, the color of the liquid coming from the vagina. Those who are not attentive to their persons do not mind them from the first. Both ascribe them to the change of life, when the signs of the uterine cancer mostly develop themselves.

Generally, however, the discharge is reported as having been sudden and profuse. In my experience, this apparently sudden flow has been almost always preceded by small shows, mostly unnoticed.

So it is exceptionally, and as by chance, that we can see the beginning of the uterine cancer, when, being called for any health disorder, our attention is driven toward the uterus, and a local examination enables us to discover the lesion.

In the lectures I have just quoted, J. Williams has, as all other observers have, as early as 1847, mentioned the tendency of women to neglect the beginning of cancer. One of Williams' patients sought advice after four years. One case (Case 3) had been mistaken for metritis, and treated as such for a good many years.

This brings us very far from the average duration of the cancer quoted by Arnott (Barnes, "Diseases of Females," 3d Ed., p. 840), 53 weeks for the true cancer, or even that of 32 weeks for the epithelioma.

My assistant at the Maternité, T. Batrix, says that three-fourths of the patients coming to the clinic are inoperable. Schatz made the same remark (*Zeitsch. f. Geb. und Gyn.*, Vol. XIII, p. 89; *Med. Chronisch.*, 1887, March, p. 509).

As a matter of practical fact, the patient comes mostly with her own diagnosis; we have only to accept it. When a uterine cancer presents itself to our observation, the neighboring organs are almost always infected, and the proximity of the uterus to its neighborhood makes the total hysterectomy dangerous, difficult, and it may be, impossible. The benefit of the operation is lost, for the operator will be obliged to leave some affected parts.

Total hysterectomy, moreover, with its striking immediate results, which seem to have been overrated, does not give very brilliant remote success. I have already quoted some statistics (Schröder's). This is Williams' opinion (p. 359): "In so far as prevention of recurrence is concerned, total extirpation presents no advantage over partial amputation." Why, then, should we expose the patient to the dangers of the total extirpation, when the principal aim or protection is to remove all the diseased parts? Pamard (*Reports Univ.*, 1887, p. 7) quotes a case where the cure lasts for two years after the galvanic amputation. Williams (p. 359) says that total hysterectomy does not help us in preventing the extension to the parametrium more than the cervical excision. He is an advocate of the partial operation (p. 359, supra-vaginal extirpation), because the disease is generally confined to the cervix; the recurrence takes place at the edge of the cicatrix (also Rochelot, p. 226). I agree with him, but this operation does not come in my actual scope of research. This is the reason why I quote his statistics taken from Schröder (p. 360). "Of 105 partial operations, ten died, the fate of seven was doubtful, 45 had a respite of one year, 41 of 18 months, 31 of two years, 27 of 2½ years, 23 of three years, 17 of 3½ years, 10 of four years, seven of 4½ years, seven of five years, three of six years, one of seven years. Out of 40 total extirpations, ten died, 14 had a respite of one year, eight of 18 months, four of two years, two of three years, one of 3½ years, and one of four years died of apoplexy. We found (p. 360), therefore, about 30 per cent. in good health after the partial operation, and only ten per cent. after total; and nearly 35 per cent. of those who recovered after partial operation, and 13 per cent. after total.

Out of the 22 cases which are the subject of Williams' lectures, two patients have undergone hysterectomy; Case 24 died rapidly; Case 20 died a month after being operated on.

In consequence of the dangers of total hysterectomy, the medicines used topically for the cancer are very numerous, as it is in all cases a formidable disease. Of these I will speak briefly. I shall not even mention the internal remedies, which, you know, have no effect except those which act as tonics in bracing up the general health of the patient. The *sulphate of iron* has this great boon—to be styptic, hæmostatic, and disinfecting. Of it I have had very limited experience except as a detersive. *Sulphate of copper* gave some improvement in some cases; for instance, Williams' Case 1 (please notice that copper was used by Celsus some nineteen centuries ago). I will say nothing of *perchloride of iron*, which is the most unfaithful hæmostatic one may use. The use of *nitrate of silver* has deplorable consequences. Certainly it is a good hæmostatic, but it seems to have the danger of stimulating the resorbent process. When the scar falls away, one finds the underlying surface in full proliferation (Bétrix, in cases of Vuillet's dilatation). *Fuming nitric acid* is very useful, especially after a good curetting. It destroys what it touches, and has not the danger of the forenamed agent. Routh and Wynn Williams commended the *bromine*, which, they say, destroys the vitality of the cancerous cell. I have used the *permanganate of potash* (Condy's fluid), as a disinfectant, and found it efficacious. *Broadbent*, having observed that acetic acid acts directly on the cancerous cell, proposed it, in order to prevent the cells from dissociating and proliferating. I got only slight advantage from it. I am bound to say the same of *pepsine*, which was believed to *digest* the cancer. It seemed to me not to diminish in any way the bulk of the tumor; it does not correct the offensive smell; quite the contrary. It takes, when in contact with the cancerous surface, a very sickening odor, similar to that of badly-digested food. I did not try the new digestive, Papain, which, no doubt, would have the same effect.

I had not the opportunity of employing *lactic acid*, commended by Mosetig (*Jour. Med.*, 1887, p. 583), who says that five or six applications succeeded in epithelioma. He used it on cotton wool well soaked with liquid lactic acid. He used also a

paste made of lactic and salicylic acids. The neighboring tissues must be protected; according to Mosetig, it destroys the growth, giving it the aspect of blackish pulp. The pain caused by its application is quite bearable. *Chloride of zinc*, in the form of arrows, gave good results, in external cancerous growths, in destroying a part of the tumor. In the uterine cancer, its application under that form would be scarcely practicable. Under the form of paste, it is diffluent; it would be difficult to isolate the neighboring organs. I shall say the same, without rejecting them altogether, about potassa caustica and *caustique Filhos*; this last one warmly commended by Richelot (1886). I have had no occasion to try the *nitrate of lead*, prescribed by Chiran (*Rev. Med.*, 1887, p. 188). He mixes a part of it with two parts of lycopodium. Currier (*N. Y. Med. Jour.*, March 8th, 1887; *Ann. Gyn.*, 1887, t. L, p. 391) makes the dressing with *iodoform* and *eucalyptus*—two capital disinfecting remedies—after using the cautery, and after removing with scissors what he can, and curetting. This is a good practice, although I would be afraid of the hemorrhage on cutting the diseased parts.

The best destroying agent, unquestionably, is the *actual cautery*, now made so handy, since Paquelin has given it the form which every one of you knows. It was commended by Celsus. With it, I obtained not definite cures, but evident and durable improvements. It has, I feel sure, postponed the death, lengthened and made more comfortable the life of the patients. It destroys the parts which it touches, stops the hemorrhages, and lessens the fetor. It must be used dark-red hot, boldly and deeply, oftentimes as soon as the slough has fallen, so as to destroy, as much as we can, all the diseased parts. The neighboring parts must be protected with Wilson's antithermic shield (1879). In the numerous cases in which I used it, I have on no occasion observed that it has stimulated the growth of the tumor. It has never, in my hands, produced occlusion of the cervix. *Chromic acid* is a very good caustic and a good disinfectant, as is every caustic. I have a limited experience of it in cases of cancer. Burow, of Königsberg, has extolled the *chlorate of potash*. It is a very good deodorant, but I have never used it in such cases. *Arsenic* (Pondu de Rousselat, arsenious acid cinnabar) is a good escharotic. It has been accused of producing poisoning. I have never noticed this fact, which, I believe, may happen.

If some would object that the treatment, at least at the onset, is almost exclusively limited to the cervix, I would answer that the primitive cancer of the body is very rare. Gusserow has collected only 80 cases. Weiss, 43 (*Annales*, p. 35). Kœberli says it is very rare (*Nouv. Archiv.*, 1886). Williams has observed that cancer of the neck has little tendency to extend to the body of the uterus, especially not along the cervical mucous membrane (pp. 59, 61). When the body is included, the dilatation after the proceeding of Vuiliet, allows the remedies to be carried up to the fundus.

I will only mention *alum* and *tannic acid*, simple astringents and hæmostatics; the solutions of *carbolic*, *thymic*, *boric*, *salicylic acids*, of *coal tar*, *bichloride of mercury;* simply disinfecting and anæsthetic dressings of *laudanum*, *hemlock*, *belladonna*, *etc.* *Chloral* is at once a disinfectant and an anæsthetic, but is also an irritant. Siredey's treatment (*Brit. Gyn. Jour.*, 1887, March, p. 97), with an injection of $\frac{1}{1000}$ of *sublimate*, taken with *chloral* and *iodoform*, is very rational. I have had no experience with it. The same may be said of *chloroform water*, which is a very good hæmostatic, especially when used hot, etc. I have had no experience of *Chian turpentine* (*Lancet*, 1886, vol. II, p. 720, Clay and Bury, ibid. p. 895).

I come, at last, to the remedy which seems to me to give the best results, and I take from Dr. Bétrix, my clinical assistant, the elements of the question. I name the *terebene*.

For some years we have used at the *Clinique Gynæcologique* a kind of dressing which has the most successful influence on the fetidity and quantity of the ichorous discharges. It does not replace the curetting with the sharp curette, nor the cauterization, but it is

used as intermediate dressing, and fills the deodorizing and antiseptic indications. We use it with equal parts of any kind of oil, first as lard for the finger, then as liquid for deodorizing injection. Now, separating the vaginal walls with Sims' or any speculum, we apply on the part three to five plugs of cotton-wool, as large as big walnuts, soaked in the terebene solution. One dry plug, larger, keeps the other *in situ*. This plugging is renewed every second to third day. The fetidity of the discharges is nearly destroyed, the quantity of the discharge is lessened, the growth of cancerous vegetations and nodosities is retarded, the hemorrhages are less frequent and less profuse. Numerous observations, which I have no time to quote, taken in our special wards for cancerous women, show the utility of this treatment.

*Terebene* is a carburet of hydrogen, isomeric with the oil of turpentine ($C_{10}H_{16}$); it is quite indifferent to the polarized light. When pure, it is colorless, limpid, has an aromatic smell analogous to that of thyme. It boils at 338.4° Fahr.; it ozonizes the air very much more than its isomeric. *It must have no acid reaction whatever.*

This is the way of preparing it: In two K. (four pounds) of oil of turpentine add very slowly 100 grammes (three ounces) of sulphuric acid, stirring continually; then let the whole quiet for one or two days. The liquid separates in two layers; the lower one is $H_2SO_4$, the upper one is terebene. Decant carefully, then filter cautiously at 212° or 230° Fahr. To expel the sulphurous and carbonic acids, neutralize exactly with carbonas calcis; pour in bottles hermetically stopped.

"Without wishing in any way to say that the cancer has a microbic origin (although some cases bear in that direction), without wishing to encroach upon the road of the pathologist or of the bacteriologist, we can try to explain the action of the terebene, if not on a special organism, at least on the numerous bacteria which are found always in the wounds undergoing degeneration or gangrene."

In favor of local treatment, and as an example of an exaggerated opinion, I may be permitted to quote a surgeon who cannot be called timid, Desprès (*Gaz. des Hôp.*, 1887, pp. 81-3): "These new operations are not always mortal. The removal of the uterus does not give such a proportion of survivals that it can legitimate an operation oftentimes mortal (deadly). Patients are not cured oftener than before. Statistics prove it. Formerly, in 1846, one patient out of ten died in the hospitals; now they die one out of seven." This observation joins that of Turguinieff (*Brit. Med. Jour.*, 1887, Vol. I., p. 116), who says that the surgical intervention invariably accelerates the course of cancer.

Desprès cites a case of a woman, 57 years of age, who had a cancer for three years (First hemorrhage, April, 1884). "The operation performed at the outset might have killed her. If not, one would have said, after one year, that she had been saved by it, at least that the operation had given her one year of life. This would not be true, since, without an operation, she has had three years of a very tolerable life."

In terminating this essay, gentlemen, I cannot but repeat what I said when I began, I do not, by any means, intend to uncrown the royal hysterectomy, nor even to make a criticism of it. I wished only to show that, in most cases of uterine cancers, it is not practicable, either because the diagnosis is not certain, or on account of the extension of the disease. I have tried to bring back the attention of gynæcologists, somewhat blinded by the boldness of great operators, to the medical local treatment, which it is designed to replace only in exceptional cases, and which gives, certainly, good results, until we find a trustworthy anti-cancerous remedy.

# DIE VAGINALE UTERUS-EXSTIRPATION BEI CARCINOM.

## VAGINAL EXTIRPATION OF THE UTERUS IN CARCINOMA.

## EXTIRPATION VAGINALE DE L'UTÉRUS DANS LE CARCINOME.

VON A. MARTIN,

Berlin.

Zehn Jahre nachdem A. W. Freund die Exstirpation des carcinomatösen Uterus wieder in die Praxis eingeführt hat, dürfte man erwarten, dass genügendes Material vorliegt, um folgende, bei jedem neuen Heilverfahren berechtigten Fragen zu beantworten:

1. Ist diese Operation mit *so viel Sicherheit des unmittelbaren Erfolges* auszuführen, dass sie nicht nur in der Hand einzelner, besonders glücklichen Operateure Erfolg verspricht?

2. Liefert die Exstirpation des carcinomatösen Uterus *Dauererfolge*, welche den bisherigen Methoden der Behandlung des Uteruskrebses gegenüber dieser Operation den Vorrang zuerkennen lassen?

Durchsehen wir zur Beantwortung der ersten Frage die Literatur, so fällt auf, dass nur sehr spärliche und vereinzelte Berichte über diese Operation in den Journalen der englischen, amerikanischen und französischen Literatur anzutreffen sind. Es ist unverkennbar, dass die Uterus-Exstirpation sich wesentlich in Deutschland Geltung verschafft hat. Hier ist an die Stelle des Verfahrens von Freund, welches eine Combination abdominaler und vaginaler Eingriffe ist, das von Czerny, Billroth und Schröder inaugurirte, rein vaginale Verfahren getreten.

Die Resultate derselben haben sich mit zunehmender Uebung und Erfahrung in sehr deutlich erkennbarer Weise verbessert:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1881 | waren | bekannt | (nach Olshausen) | 41 | Fälle | mit | 29 pCt. | Mortalität, |
| 1883 | " | " | (nach Sänger) | 133 | " | " | 28 " | " |
| 1854 | " | " | (nach Engström) | 157 | " | " | 29 " | " |
| 1886 | " | " | (nach Hegar) | 257 | " | " | 23 " | " |

Durch die collegiale Gefälligkeit derjenigen Operateure, die meines Wissens über das grösste Material verfügen und auf meine Anfrage dasselbe mir bis zum Schlusse des Jahres 1886 zur Verfügung stellten, bin ich in der Lage, folgende Tabelle aufzustellen:

### TABELLE I.

Bis Ende 1886 haben wegen Corcinoma Uteri die Total-Exstirpation vorgenommen:

| | | | | | |
|---|---|---|---|---|---|
| Fritsch | 60 | Mal | mit | 7 | Todesfällen, |
| Leopold | 42 | " | " | 4 | " |
| Olshausen | 47 | " | " | 12 | " |
| Schröder-Hofmeier | 74 | " | " | 12 | " |
| Staude | 22 | " | " | 1 | " |
| A. Martin | 66 | " | " | 11 | " |

Auf 311 Fälle kamen 47 Todesfälle = 15.1 pCt.

Das Gesammtresultat stellt sich darnach so, dass die vaginale Total-Exstirpation wegen Krebs des Uterus bei einer Zahl von 311 Operationen eine Mortalität von 15.1% ergeben hat. Und ist es nicht berechtigt, anzunehmen, dass diese Mortalitätsziffer mit zunehmender Erfahrung noch weiter sinken wird, wie ja schon die letzten Zahlenreihen der einzelnen Operateure einen derartigen Fortschritt erkennen lassen?

Schon heute aber rangirt demnach die vaginale Total-Exstirpation wegen Krebs mit ihrer Mortalität vor der Amputation der Mamma, für welche *Küster* auf dem XII. Congress der deutschen Gesellschaft für Chirurgie 1883 aus 778 Fällen eine Mortalität von 15.6% berechnet hat. Und wer wollte Anstand nehmen, bei der carcinomatösen Erkrankung der Brust dreist die Absetzung derselben vorzuschlagen und, so früh als die Diagnose gestellt ist, auszuführen?

Ich stehe also nicht an, die *erste Frage* mit einem bedingungslosen *Ja!* zu beantworten und dieser *Operation der vaginalen Total-Exstirpation des carcinomatösen Uterus ein Bürgerrecht unter den Methoden der Krebsbehandlung zu vindiciren.*

Zur Beantwortung der zweiten Frage stehen uns bisher nur die relativ kleinen Zahlen von Schröder, die Hofmeier gesammelt hat, die von Fritsch, Leopold und die meinigen zur Verfügung. Diese Zahlen sind auf der beiliegenden Tabelle II vereinigt und ergeben, dass die Dauererfolge der vaginalen Total-Exstirpation bei der relativen Kürze der betreffenden Beobachtungen unbedingt den besten Erfolgen der Krebsoperation an anderen Organen an die Seite gestellt werden dürfen. (Vergleiche Tabelle III, die Resultate des Verfassers.)

## TABELLE II.—DAUERERFOLGE.

TOTAL-EXSTIRPATION WEGEN CARCINOM.

| Operateur. | Summe der Operationen. | Davon scheiden aus durch | | | | | Restsumme der in Betracht kommenden Fälle. | Davon recidiv frei. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Tod nach Operat. | Kürzer als 1 Jahr. | Interkurrente Krankheiten. | Unbekannt. | Summe. | | 1. Jahr. — 1 Jahr. | Nach 1½ Jahr. | Nach 2 Jahren. | Nach 3 Jahren. | Nach 4 Jahren. | Nach 5 Jahren. | Nach 6 Jahren. |
| Leopold..... ..... (Briefl. Mittheilung.) | 42 | 3 | 11 | 2 | 2 | 18 | 24 | 16 | 9 | 5 | 2 | .. | .. | .. |
| Hofmeier ..... (Schröder) Nur Cervixcarcinom. (Zeitsch. für Geb. und Gyn. XIII.) | 46 | 12 | .. | .. | 1 | .. | 33 | 20 | 10<br>6 R.<br>4 ? | 7<br>1 R.<br>2 ? | 4<br>1 R.<br>1 ?<br>1 Nephritis. | 0<br>3 ?<br>1 Apoplexie. | .. | .. |
| Fritsch..... (Archiv f. Gyn. XXIX.) | 60 | 7 | .. | .. | .. | .. | 20 | 17 | .. | 7 | 2 | .. | .. | .. |
| A. Martin..... (Berl. kl. Woch., No. 5, 1887.) | 66 | 11 | 11 | .. | .. | 22 | 44 | 35 | 32<br>2 R.<br>1 ? | 25<br>6 ?<br>1 + Phthise | 20<br>4 ?<br>1 + Phthise | 5<br>14 ?<br>1 R. | 3<br>2 ? | 2<br>1 ? |

Von meinen 44 Totalexstirpationen sind innerhalb des ersten Jahres post operat. recidiv geworden 9.
Von den restirenden 35 waren operirt worden:

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | „ | „ | 1880. | Davon lebten (1886) nach 6 Jahren 1, recidiv 1, interkurrent gestorben 1. | | | | | | | | | | |
| 3 | „ | „ | 1881. | „ | „ | „ | „ | 6 | „ | 1, | | | | |
| | | | | | | (1885) | „ | 5 | „ | 1, | | | | |
| | | | | | | | „ | 4 | „ | 1, | | | | |
| 8 | „ | „ | 1882. | „ | „ | (1886) | „ | 4 | „ | 2, | | | | |
| | | | | | | | „ | 3½ | „ | 2, | „ | 1, | | |
| | | | | | | | „ | 3 | „ | 2, | | | | |
| | | | | | | | „ | 2½ | „ | —, | „ | —, | „ | „ 1. |
| 5 | „ | „ | 1883. | „ | „ | (1886) | „ | 3½ | „ | 2, | | | | |
| | | | | | | | „ | 3 | „ | 3, | | | | |
| 8 | „ | „ | 1884. | „ | „ | (1886) | „ | 3 | „ | 4, | | | | |
| | | | | | | | „ | 2½ | „ | 1, | | | | |
| | | | | | | (1885) | „ | 2 | „ | 3, | | | | |
| 8 | „ | „ | 1885. | „ | „ | (1886) | „ | 1½ | „ | 6, | „ | 1, | | |
| | | | | | | | „ | 1 | „ | 1. | | | | |

## TABELLE III.

EXSTIRPATIO UTERI VAGINALIS AUS GESUNDER UMGEBUNG, OHNE DI
DIE OPERATION. — A. MARTIN.

| Jahr der Operation. | Cancroide durch Portio. | | | Carcinoma Colli. | | |
|---|---|---|---|---|---|---|
| | Zahl der Fälle. | Davon sind | | Zahl der Fälle. | Davon sin | |
| | | gesund. | recid. | | gesund. | re |
| 1880 | .. | .. | .. | 2 | 1[1]) | |
| 1881 | .. | .. | .. | 6 | 2 | |
| 1882 | .. | .. | .. | 6 | 2[2]) | |
| 1883 | .. | .. | .. | 2 | 2 | . |
| 1884 | 2 | 2 | .. | 4 | 4 | . |
| 1885 | 1 | .. | 1 | 8 | 6 | |
| Bis Ende 1885 | 3 | 2 | 1 | 28 | 17 | 1 |
| 1886 | 1 | .. | 1 | 7 | .. | |
| 1887 | 1 | .. | .. | 1 | .. | . |

1) Starb nach 1¾ Jahren an Phthisis pulmonum.
2) Eine starb nach 3½ Jahren an Phthisis pulmonum.
3) Starb nach 4 Jahren an Carcinoma ovarii bei gesunder Narbe in

Bis Ende 1885 operirt 44.
Davon recidiv ..... 13 = 29.7 pCt.
Davon genesen..... 31 = 70.3 pCt.

Gibt es nun ein anderes Verfahren bei der Krebsbehand Mortalität gleich gute Resultate verspricht?

Eine solche Therapie gibt es nicht für die Carcinome Formen der Collumerkrankung, bei denen die Schleimh Ausgangspunkt ist oder der carcinomatöse Knoten des Collu erscheint zulässig nur für die Formen des Portio-Cancroid, der Portio entstanden, also von einem plattenepithel-bede entsprungen, nach der Ansicht von C. Ruge und Veit, von S wesentlich weniger bösartigen Charakter haben, als die v Collumcarcinom. Nach Hofmeier hat die hohe Excision de Operations-Mortalität von 7.4% ergeben und ein Heilresu 33% nach vier Jahren. — Dass Recidive dadurch nicht a Hofmeier's Mittheilungen bestätigt und damit die Annah Excision ein sicheres Mittel für diese Formen von Portio-C

Meine eigenen Beobachtungen in 28 Fällen ergeben, Einfluss der Operation gestorben sind. Aber alle Ueberle Frist, wenige erst im Verlauf des zweiten Jahres recidiv ge hebt Fritsch hervor, dass die Beobachtungen von Fällen des Carcinom am Collum und im Corpus, wie Binswanger Fälle beschrieben haben, schon an sich daran irre machen l auch nur der Portio den Uteruskörper zu erhalten streben nachherigen Schwangerschaft ist nicht ausgeschlossen, aber gerschaft für etwas sehr Bedenkliches bei Carcinom erklär Landau, einen schwangeren Uterus mit Portio Carcinom Deshalb halte ich dafür, dass wir besser thun, auch bei d cinom alsbald die vaginale Totalexstirpation zu machen.

Je früher wir operiren, um so mehr dürfen wir hoffen, u

Geschick des Carcinomtodes zu ersparen; je früher wir operiren, um so besser stellen sich, im Hinblick auf die ungeschwächte Lebenskraft der Kranken, die Hoffnungen auf die Genesung von der Operation. Wie aber auch immer eine auf längere Jahre sich ausbreitende Statistik in diesen Fragen entscheiden mag, Erfolge, wie sie die beistehende Tabelle III bezeugt, sind jedenfalls dazu angethan, diesem Vorgehen volles Bürgerrecht unter den Behandlungsmethoden des Carcinom zu sichern.

Je grösser die Erfahrung mit der vaginalen Totalexstirpation geworden, um so mehr hat sich das *Gesetz* herausgebildet, *dass man nur dann die Operation ausführen soll, wenn die Umgebung des Uterus vollständig frei ist von carcinomatöser Infiltration.*

Alle Versuche nach dieser Richtung, die Grenzen der Operation zu erweitern, sind erfolglos. Die Operation wird durch solche Infiltrationen erheblich erschwert und die Gefahr der Operation erhöht. (Vergl. Tabelle IV.) Auf dauernde Heilung ist nicht zu rechnen.

Die Mehrzahl der Operateure ist, soviel ich erfahre, ebenso wie ich, dahin gekommen, diese Fälle nicht mehr auch nur dem Versuch einer radikalen Operation auszusetzen. Breitet sich das Carcinom in Form mässiger Infiltration der Ligamente und des Scheidenrohres aus, so dürfte die Erkenntniss und die Entscheidung Schwierigkeiten nicht unterliegen. Die Ausbreitung auf dem Wege der Lymphbahnen dagegen entzieht sich nicht selten der Diagnose vor der Eröffnung der Bauchhöhle. Solche Fälle sind dann zwar für die Operationsprognose denen mit freier Umgebung ähnlich, für die dauernde Heilung dagegen absolut ungünstig; man muss sie gewiss bei Berechnung des Heilresultates in einer eigenen Rubrik führen.

Narben nach vorausgegangenen Entzündungen im Beckenboden können die Operation ebenfalls sehr erschweren und trüben ebenfalls die Prognose durch die oft sehr bedenkliche Reaktion unmittelbar auf den Eingriff. Jedenfalls sollte man sich nur dann an derartige Fälle wagen, wenn man einer dringlichen Indikation gegenüber steht und möglichst grosse Uebung in derartigen Operationen besitzt.

Die *Technik der Operation* selbst ist in nur unerheblichen Dingen von dem Verfahren weiter entwickelt, welches Czerny und Billroth und Schröder gleich von Anfang an angegeben haben. Es macht keinen erheblichen Unterschied — wie die Erfolge der einzelnen Operateure zeigen —, ob man den Uterus zuerst hinten ausschneidet, oder zuerst an den Seiten, oder vorn. Es bleibt sich gleich, ob man ihn erst vorn und an den Seiten auslöst und die zu durchschneidenden Verbindungen vor der Durchschneidung unterbindet, oder ob man jedes einzelne Gefäss, das spritzt, fasst und versorgt. Es ist unerheblich, ob man den Uterus vor der völligen Auslösung umstülpt oder sonst herauszieht; ob man das Loch im Beckenboden vernäht oder drainirt, sei es mit Iodoform-Gaze oder einem Drainschlauch.

Wenn leicht thunlich, rathe ich, auch die Ovarien und Tuben mit herauszunehmen. Jedenfalls muss die Blutung vollständig stehen und für die Reconvalescenz diese Theile in möglichster Ruhe erhalten werden. Ausspülungen des Peritoneum scheinen nicht günstig zu wirken.

Wie immer die Oeffnung im Beckenboden behandelt wird, es bildet sich eine glatte Narbe, zu der hin das Scheidengewölbe sich domartig wölbt. Die Patienten machen, wenn sie nicht septisch sind, oder sonstige Complicationen eintreten, eine überraschend glatte Reconvalescenz durch. Dann pflegen sie aufzublühen, und nachdem die Symptome des akuten Klimakterium überwunden sind, erscheinen sie voll Lebenslust und Muth. Noch keine Beobachtung hat gezeigt, dass die Frauen mit der Wegnahme des Uterus, mit oder ohne Adnexa, ihren weiblichen Instinkt oder die dem Weibe eigenthümlichen Körperformen verlören.

*Ich empfehle also die vaginale Exstirpation des Uterus als die Operation und das Heilmittel, welches bei krebsiger Erkrankung des Uterus in Anwendung zu bringen ist, so lange als die Erkrankung noch auf den Uterus beschränkt ist.*

## TABELLE IV.

EXSTIRPATIO UTERI VAGINALIS WEGEN CARCINOM. IMPERFEKTE FÄLLE VON A. MARTIN.

| No. | Operateur. | Datum. | Name. | Klinischer Befund. | Tod. | Notizen über das Recidiv. | Bemerkung. |
|---|---|---|---|---|---|---|---|
| 1. | A. M. | 10. 6. 80. | König. | Carcinoma colli. Knoten im Lig. lat. | — | Recidiv 1881. | — |
| 2. | A. M. | 21. 6. 80. | Weihe. | Carcinoma colli. | † | Fettherz. Collaps 24. 6. 80. | — |
| 3. | A. M. | 24. 7. 80. | Dubczyeski. | Carcinoma colli. | — | Recidiv † 1882. | — |
| 4. | A. M. | 19. 10. 80. | Peglow. | Carcinoma colli. | † | Kleine Drüsen unter d. Perit. Collaps. | — |
| 5. | A. M. | 18. 11. 80. | Thelitz. | Carcinoma colli. | † | Parametrium infiltrirt. | — |
| 6. | A. M. | 10. 3. 81. | Schneider. | Carcinoma colli. Infiltration im Lig. | — | Ende 1881. | — |
| 7. | A. M. | 13. 3. 82. | Leue. | Carcinoma colli. Infiltration im Lig. | † | Septisch. | — |
| 8. | A. M. | 20. 5. 82. | Geit. | Carcinoma colli. Carcinoma periton. | — | September 1882. | — |
| 9. | A. M. | 6. 10. 82. | Klum. | Carcinoma colli. Kleine Drüsen im Lig. lat. | — | Ende 1883 †. | — |
| 10. | A. M. | 16. 12. 82. | Lüdicke. | Carcinoma colli. Drüseninfiltrat. | — | Recidiv bald nach der Operation. | — |
| 11. | A. M. | 10. 3. 83. | Harbach. | Carcinoma colli et forn. post. Drüseninfil. | — | Recidiv 14 Tage n. d. Oper. bemerkbar. | — |
| 12. | A. M. | 16. 6. 83. | Sim. | Carcinoma colli. Drüseninfiltrat. | — | — | — |
| 13. | Düvelius. | 28. 8. 83. | Ehrhardt. | Carcinoma colli. L. Parametr. infiltr. | — | Recidiv 3 Monate nach der Operation. | — |
| 14. | A. M. | 16. 10. 83. | Bockrandt. | Carcinoma colli. Beide Parametr. infiltr. | † | Kachexie. † ohne lokale Reaktion. | — |
| 15. | A. M. | 20. 2. 84. | Bull. | Carcinoma colli. | — | Recidiv nach 3 Monaten. | — |
| 16. | A. M. | 27. 7. 84. | Meyer. | Carcinoma colli. | — | Recidiv nach 5 Monaten. | — |
| 17. | A. M. | 20. 10. 84. | Hirsch. | Carcinoma colli. L. Parametr. infiltr. | — | Recidiv nach 3 Monaten. | — |

Dr. A. Reeves Jackson, of Chicago, Ill., followed with a paper on—

## THE MODERN TREATMENT OF CANCER OF THE UTERUS.

### TRAITEMENT MODERNE DU CANCER UTÉRIN.

### DIE MODERNE BEHANDLUNG DES UTERUSKREBSES.

A rational basis for the proper treatment of any disease comprises at least two elements—correct views of its pathology, and accurate diagnosis. Without these, treatment, while possibly useful, can only be empirical.

The present methods employed for the radical treatment of cancer are founded upon the theory that the disease is originally local, and that it is susceptible of cure by removal of the diseased structures. Formerly, a different opinion was generally held, the disease being considered as a local manifestation of a morbid condition of the blood; and this theory has not even yet been wholly abandoned. Whatever the pathological truth may be, it must be admitted that the treatment of the disease has been eminently unsatisfactory; that medicinal and hygienic efforts have been as unavailing in preventing its deathward progress as have surgical means in effecting its complete and permanent removal. Not that treatment has failed in every instance; trustworthy observers have reported cases in which undoubted carcinoma has disappeared under the use, and apparently in consequence of, certain medicinal substances taken into the stomach. Equally well authenticated are reports of instances in which operative measures have been followed by complete cure. But these favorable results have been comparatively so few in number as rather to afford encouragement to persevering effort than to expectation of success.

Of the recoveries from cancerous disease, by far the greater number have been effected by removal of the diseased tissues; indeed, so exceptional have been the cases in which any permanent benefit has been observed to follow the use of internal medication, that this method, except as an adjuvant, is seldom employed, and in the judgment of most medical practitioners, only surgical means are available.

*Diagnosis.*—While it is not commonly difficult to diagnosticate the presence of cancer in its more advanced stages, our knowledge of its beginning is lamentably deficient. Who can tell the cause and nature of the transition from benign to malignant structure? After the change has taken place we may learn by means of the microscope that certain alterations have occurred in what were formerly normal typical cells, or at least that atypical cells are present; that other cells contiguous to those first affected become rapidly involved ; and, still further, that at a considerable distance from these, and with healthy tissues intervening, may be found other atypical cells, each endowed with an aggressive tendency to influence its neighbors, and thus to become a nucleus for the further spread of disease. Whence come those outlying germs? Have they been conveyed by way of the lymph vessels, or otherwise, from the part primarily affected, or had they a separate and independent origin? However this may be, the important fact to the surgeon is that such separated localities of disease may and do exist, and that during their earlier stages he cannot, either before or during operation, possibly know of their presence. This circumstance, more than any other, explains the frequent failure of operative measures to cure cancer; they fail to remove all of the diseased tissues. And the uncertainty of the surgeon's ability to do this should always be recognized. For his purpose, the diagnosis must do more than determine the presence of malignant disease—it must also determine its extent. This,

I aver, cannot at present be done in the case of cancer of the uterus. Schroeder thought that by the touch alone he could detect with certainty minute infiltrations along the lines of the lymphatic vessels. But Schroeder was mistaken, and no better evidence of the unreliability of this method can be adduced than the fact of the rapid and numerous recurrences of the disease which followed his own operations, which were based presumably upon the fullest attainable diagnostic knowledge. Indeed, it could not be otherwise. The earlier changes of cell formation which take place in malignant disease are microscopic, and no human touch is sufficiently subtle to detect them, even if the affected tissues were placed directly between the fingers, much less when they are enveloped by dense masses of intervening structures. Clearly, then, it cannot be known, in advance of operation, at what distance from the central or manifestly affected part isolated atypical cells may be found, or, in the case of uterine cancer, when, or whether, or to what extent the vagina, broad ligaments, or other neighboring structures, may be involved. It is because these things cannot be known that all treatment of cancer which depends for ultimate success upon removal of the diseased tissues must ever be uncertain.

Diagnosis is not always easy, even after the disease has considerably advanced, and when the investigation has been aided by the microscope. On more than one occasion I have received contradictory reports from two, and in one case from three, microscopists to whom had been submitted specimens from the same growth. Others have had a similar experience.

*Treatment.*—In all cases of uterine disease in which the diagnosis of malignancy is doubtful, the patient should be given the benefit of the doubt by the prompt removal of the disease, if this be possible. If radical treatment be delayed until an affirmative diagnosis can be positively made, the chances for success are greatly lessened. When we shall have learned to detect what I have no doubt exists, namely, a pre-cancerous or transition stage between inflammation and carcinoma, and shall have learned to act upon the knowledge, then, and not till then, shall we be able to cope, with some satisfactory degree of success, with a now dreaded and practically incurable disease.

Likewise, after the diagnosis of malignancy has been affirmed, the diseased part should be removed, if it appear that this can be done. Any delay, dangerous enough in the doubtful or very early stage, is still more dangerous now. The disease from the beginning progresses, and there comes a time when it passes beyond our surgical reach.

The methods in vogue for the removal of cancer of the uterus are chiefly the following: Caustics, cautery, amputation by galvano-cautery or knife, and total extirpation of the uterus.

*Caustics.*—These are not so much used as formerly, from the fact that they are less efficient and more limited in their applicability than other methods. Chloride of zinc and potassa cum calce are the most esteemed of this class of remedies. In one case, Dr. DeLaskie Miller, of Chicago, removed an extensive carcinoma of the cervix by a single very free application of the acid nitrate of mercury. The operation was followed by a severe attack of ptyalism and the separation of a large slough. The result was most satisfactory, the patient being quite well six years afterward.

Caustics are only properly applicable to slight and superficial involvement of structure, and in no case do they offer any advantage over the more cleanly and less painful removal of the affected parts by means of the knife or scissors. However, after cutting operations of doubtful completeness, I am in the habit of applying to the fresh surface a fifty per cent. solution of chloride of zinc on a pledget of cotton, which is allowed to remain until the resulting slough is self-loosened. I prefer this to the Paquelin cautery, which I have sometimes used for the same purpose.

### AMPUTATION BY GALVANO-CAUTERY.

In 1882, Pawlik* published a report of 136 cases of cancer of the cervix which had been treated in the first gynæcological clinic of Vienna, by means of the galvano-cautery, the observations extending back to 1861. The mortality from the operation, although not exactly stated, must have been exceedingly small, apparently not over three or four per cent. Ten died in hospital; one from peritonitis, one from marasmus, twenty-five days after operation, three from anæmia, one from recurrence four months after operation. Of the other cases twenty-two relapsed and died, the date of death being unknown except in a few cases. One of them remained in good health for nineteen months, and another for six years. Two died in childbirth, without recurrence, one in seven and a half years, and the other a year later. Of the entire number, thirty-three remained healthy, as follows: Twenty-one years after operation, one; twelve years after, two; eight years after, three; seven years after, three; four years after, two; three years after, five; two years after, seven; one year after, seven.

By amputation with the hot iron, Schroeder,† out of thirteen cases, had an operation mortality of 7.7 per cent., and of the survivors forty-two per cent. remained well at the end of eighteen months to two years. Carl Braun and Simpson cite the histories of patients who were operated upon in this manner, and who had continued alive and well for a quarter of a century.

Notwithstanding the theoretical advantages which have been claimed for the operation by the knife, the foregoing results have never been equaled, so far as I am aware, by any form of cutting operation in any considerable number of cases.

### AMPUTATION BY THE KNIFE.

At the meeting of the Obstetrical Society of Berlin, held October 23d, 1885, Hofmeier‡ reported the number and results of Schroeder's partial ablations of the uterus for cancer, and compared them with the results of total extirpation by the same operator. The report included all of the cases which had been operated upon from October 1st, 1878, to October 1st, 1885. During that period there were 118 partial amputations, with ten deaths. Mortality, 8.5 per cent., and 48 total extirpations, with twelve deaths; mortality, 25 per cent.

In a subsequent report, Hofmeier stated that from December 31st, 1883, to date of report—that is, the later cases—there had been eighty-three supra-vaginal amputations, with eight deaths; mortality, 9.6 per cent. In these the result was doubtful in 19; relapses within two years, 35, or 42 per cent.; free from disease two years or longer, 21, 25.4 per cent. During the same period there were 35 total extirpations, with nine deaths; mortality, 25.7 per cent.; result unknown in six; relapses within two years, 15, 42.8 per cent.; free from disease two years or more, 5, 14.2 per cent.

In 1882,§ Dr. W. H. Baker, of Boston, published the details of a method of high amputation devised by himself, and gave the histories of ten cases in which he had employed it. This report was supplemented by another,‖ showing the status of these patients in January, 1886. The remarkable and very gratifying results are as follows: One patient well eight years after operating; one after six years and two months; one after six years; one after five years and three months; one after four years and eight months; one after four years. One patient died at the end of four months. There was no death immediately after operation. In percentages the results were: 60 per cent. well four years or more after operation. Dr. Baker considers that after any

* *American Journal of Medical Sciences*, October, 1884, p. 605.

† Post, *American Journal of Medical Sciences*, vol. xci, p. 140.

‡ *American Journal of Obstetrics*, Vol. xix, 1886, page 207.

‖ *Ibid.*, February, 1886, page 184.

§ *Ibid.*, 1882, p. 265.

operation for cancer, patients cannot be pronounced cured until four years have elapsed without recurrence. The best reported results from other methods of high amputation show a mortality of 7.3 per cent.

Baker claims for this method over others the following advantages: 1. More of the uterus may be removed; 2. The peritoneal cavity is not necessarily opened; 3. It gives a larger percentage of cures.

I have operated substantially according to the methods of Baker 21 times, the results being shown in the following table:

TABLE SHOWING THE RESULTS IN TWENTY-ONE CASES OF HIGH AMPUTATION OF UTERUS, FOR CANCER.

| No. | Initials of Patient's Name. | Residence. | Age. | Date of Operation. | Result. | REMARKS. |
|---|---|---|---|---|---|---|
| 1 | R. M. | Englewood, Ill. | 41 | March 17, 1882 | D. | Death on sixth day. |
| 2 | K. M. | Chicago | 45 | April 17, 1883 | R. | Died 8 months after, from recurrence of disease. |
| 3 | S. M. | Chicago | 45 | June 16, 1883 | R. | Recurrence in 4 months. Date of death not known. |
| 4 | N. A. L. | Ottawa, Ill. | 32 | Aug. 15, 1883 | R. | Had child 2 years later. Alive and well, July, 1887, 3 years and 11 months after operation. |
| 5 | M. S. | | 54 | Jan. 29, 1884 | R. | Reports herself "perfectly well," June, 1887, 3 years and 7 months after operation. |
| 6 | T. Y. | Chicago | 41 | Feb. 6, 1884 | R | History unknown after 3 months. |
| 7 | G. M. | Chicago | 57 | April 12, 1884 | R. | Recurrence in 11 months; death in 15 months. |
| 8 | L. G. | Chicago | 26 | April 14, 1884 | R. | Recurrence in 2 months; death in 4. |
| 9 | O. S. | Chicago | 41 | May 25, 1884 | D. | Death on fifth day. |
| 10 | J. M. | Mattoon, Ill. | 38 | May 5, 1885 | R. | Disease reappeared in parametria. Death Sept. 20th, 1885; 4½ months. |
| 11 | A. M. | Chicago | 48 | May 30, 1885 | R. | No recurrence and health good, July 1st, 1887; 2 years and 2 months. |
| 12 | H. H. | Chicago | 72 | June 17, 1885 | R. | Subsequent history unknown. |
| 13 | M. W. | Dubuque, Ia. | 50 | Sept. 23, 1885 | R. | Well August, 1887, 1 year and 11 months after operation. |
| 14 | M. J. | Chicago | 40 | Nov. 25, 1885 | R. | No recurrence and health good, 1 year and 9 months after operation. |
| 15 | R. M. | Leavenworth, Kans. | 50 | Dec. 2, 1885 | R. | Well Feb. 11th, 1886; no later report. |
| 16 | L. H. | Chicago | 47 | May 8, 1886 | R. | Recurrence in 5 months, death in 8. |
| 17 | A. C. | Chicago | 51 | June 24, 1886 | R. | Recurrence; death in 9 months. |
| 18 | R. L. | Dubuque, Ia. | 64 | Oct. 23, 1886 | R. | No recurrence July 1st, 1887—9 months. |
| 19 | E. W. | Aurora, Ill. | 50 | Feb. 14, 1887 | R. | No recurrence July 1st, 1887—5 months. |
| 20 | R. S. | Chicago | 40 | Feb. 22, 1887 | R. | No recurrence July 20th, 1887—5½ months. |
| 21 | J. L. | Chicago | 38 | March 10, 1887. | R. | No recurrence July 30th, 1887—3½ months |

From the foregoing table it appears that there were two deaths as the direct result of the operation—mortality, 9.5 per cent. Of those who recovered, nine are still alive and were well at a recent date. The periods which have elapsed since the date of operation in these cases are as follows: In one, three years and eleven months; one, three years and seven months; one, two years and two months; one, one year and eleven months; one, one year and nine months; one, nine months; one, six months; one, five months; one, four months. In six cases there was recurrence of disease and subsequent death. In four cases the history is unknown after a few months. The earliest known symptoms of recurrence appeared in two months, and the latest in

eleven months, the average, based upon four observations, being 5½ months. The average time of death after operation was 8⅔ months, the earliest being four months and the latest 15 months. The age of the youngest patient was 32, and that of the eldest 72 years.

EXTIRPATION OF THE UTERUS.*

In the reasonable expectation that by the removal of the entire affected organ there would be greater likelihood of eradicating the disease, the cancerous uterus has been extirpated about 500 times, approximately 150 times by the abdominal and 350 by the vaginal method.

This number is now sufficiently large, and enough time has elapsed since the revival of the operation by Freund, in 1878, to enable us to form a fair estimate of its value as a curative method of treatment.

Owing to the frightful mortality attending the abdominal operation—not less than 72 per cent., and probably considerably more—it has been abandoned, except in a comparatively small number of cases in which the vaginal method is inapplicable. Nevertheless, its statistics are valuable as bearing upon the questions of recurrence and permanent cure. And upon this point I may say that of the survivors more than one-half died within six months, and scarcely any lived a year. In a single instance reported by Dr. Linkenfeld, assistant at the clinic of Strassburg, relapse did not take place until 2½ years after operation.

The mortality of kolpo-hysterectomy, according to the statistics compiled by Dr. Post, is shown to be 27 per cent. in 341 cases. This is one per cent. less than the result of the first 29 operations collected by Hegar and Kaltenbach and published six years ago; and 2.4 per cent. greater than the result in 256 cases published by Mundé, in September, 1884.†

The statement has been made that the mortality of the operation is steadily lessening year by year. While this may be true, these tables hardly show the fact.

In the case of a few operators improvement has unquestionably occurred, but it is by no means general. Nor will some of the facts upon which the statement has been based bear investigation. For example, a recent writer,‡ in an endeavor to show that the high death rate should no longer be urged against the operation, states that "Martin has a mortality, over nearly 60 operations, of only nine per cent." Martin himself, at the meeting of the Obstetrical Society of Berlin, on May 24th, 1884, reported that of 31 total extirpations he had lost 11—a mortality of over 35 per cent.; and if in a total of 60 cases not a single additional death occurred, his mortality would still be over 18 per cent. Comment is unnecessary.

The only valid claim that can be made for the favorable recognition of kolpo-hysterectomy is that it prolongs and saves life. Does it do this? In the 341 cases reported by Dr. Post, there were 93 deaths. What is the significance of this fact? While we cannot know just how long these 93 women would have lived if permitted, we can at least form an approximate estimate. According to the observations of Gusserow, Lebert, Wert, Seifert and others, the duration of life in patients with cancer, from the first manifestation of symptoms, is 20 months. The statistics of Paget and Sibley show that cancer patients without operation are likely to die in three or

* In addition to 93 cases collected by Kaltenbach, Duncan (London *Lancet*, Jan. 31st, 1885) cited 44 cases by the abdominal method, and Dr. Sarah E. Post (*American Journal of Medical Sciences*, January, 1886) has collected 341 cases of kolpo-hysterectomy.

† Since the above was written, Dr. A. Palmer Dudley (*New York Medical Journal* for July 9th and 16th, 1887) has compiled a table of 66 cases by American operators. 23 of the patients died within a week—mortality, 34.8 per cent.

‡ "Abdominal Surgery," J. Greig Smith, P. Blakiston, Son & Co., 1887, p. 181.

four years. Accepting the lower of these estimates, those 93 women who died would have lived an aggregate of 155 years. A loss of more than a century and a half of human life must be charged at once to the account of the operation. What is there to offset this? Have other lives, otherwise doomed, been so prolonged as to balance this terrible debit? We shall see.

It has been shown that in those who survive the operation recurrence takes place, on an average, in about 4½ months, and death in 14 months (Sänger*). So that the survivors of these 341 operations, numbering 248 persons, would live a total of 289 years; whereas, if uninterfered with or treated only by palliative measures, they would have lived an aggregate of 413 years, a difference of 124 years. This number added to the 155, the immediate loss by the operation mortality, makes a total of 279 years! The history of surgery surely fails to furnish a parallel to this.

Even this ghastly arraignment does not cover all the facts. If the records were complete, the showing would be still worse.

I have for a long time believed that the statistics upon this subject are unreliable, and that if the whole truth were known, the results of the operation would be still more unfavorable than they now appear.

In order to test the correctness of this opinion, I have recently obtained the histories of 17 cases of vaginal hysterectomy for cancer which have been performed in Chicago, and I failed to get all of them. Except in three of the cases, these reports have been furnished directly by the operators. All of them are authentic. Of the 17 operations, nine were promptly fatal; one of the survivors lived six months; one lived two years; one lived three years and eight months. The remaining five are still living, the operations having been done, respectively, seven, five and four months, and one five weeks ago. Of the 17 cases with a mortality over 50 per cent., two only have been published.

Statistical tables made up of variously combined individual reports, which do not furnish names, dates, localities, or other details capable of verification, are of doubtful value, for it is quite impossible that the compiler should know which cases are included and which omitted. In the case of operations in which the death rate is a principal or important factor, those which are successful are much more likely to be published than the others. They are not infrequently reported within a few days, or even a few hours, to the medical society or the medical journal. From these they get into somebody's table, and they remain there under the original heading "Successful," although death may have occurred immediately after the report. The fatal cases can always wait—a good many are still waiting.

These facts are not new. Everybody knows of them. And it would seem as though any one who would base his actions or belief upon statistical tables constructed upon the modern pattern, must be most comfortably guileless and unsuspecting.

I have already stated that in the survivors after kolpo-hysterectomy recurrence takes place in 4½ months, on the average. It is sometimes very much earlier. What besides the quickly-following death does this signify? First, and undoubtedly, that the disease was not removed, that the so-called recurrence was simply *continuance*. Secondly, it ought to signify that it was not removed because the operator was unable to diagnosticate its extent. This is the only charitable interpretation of his act; for, otherwise, we should be forced to conclude either that he had not endeavored to ascertain this most important fact, or had subjected his patient to a dangerous and useless operation without reference to the result.

Indeed, I am afraid that there are some who would be obliged to perch upon the latter unenviable horn of a dilemma; for, after reading the detailed reports of some

* Sänger, *Archiv f. Gynäk*, XXXI, 1, states that in six cases observed by him, the average time which elapsed between the operation and death was 14.1 months.

of the cases which have been published, I could not but believe that the operators had shown more enterprise than judgment—more zeal than honesty. A broad distinction should be made between surgical boldness and surgical recklessness; the one is as admirable as the other is reprehensible.

The actions of men do not always represent their opinions; that is, men are not always honest with themselves. A recent illustration of this was afforded me in connection with this subject. In conversation with two of our most distinguished surgeons, one said to me: "I have performed the operation three times; it seems shameful, does it not?" The other, who had also made three operations, all the patients surviving, said: "Yet, I am not sure that the operation is justifiable in any case."

Is extirpation of the cancerous uterus a justifiable operation? I affirm that it is not.

It has already been shown that, as compared with other methods of treatment, hysterectomy, whether by way of the abdomen or vagina, has given inferior results. Its primary mortality is very much greater, and recurrence and death are as quick and as sure. Theoretically it would seem that extirpation should offer more certain immunity against return of the disease than any minor method of treatment; and if this were shown to be true in a considerable degree, its larger mortality would scarcely be a valid argument against it. But the facts, so far as known, show that the reverse is true. Partial amputation by means of the galvano-cautery, or with the hot iron, or with the knife—the latter especially when followed by the use of caustics or the cautery—has given incomparably better results, both as regards the immediate death rate and ultimate results, than ablation of the uterus.

When cancer is limited to the cervical mucous lining, the removal of the entire organ is surely not indicated. The excision of a conical portion, including the external os uteri and extending beyond the internal os, should be sufficient to remove all of the diseased tissue. In cancer of the cervix, for which at least ninety per cent. of the operations have been performed, it is wholly improper, because dangerous and unnecessary. It is four times more dangerous than any form of high amputation, and unnecessary, because, owing to the fact that the extension of cervical cancer is circumferential and not upward, supra-vaginal amputation is capable of doing all that can be done by total extirpation at any curable stage of the disease.

This, then, practically reduces the field of the operation to cancer of the uterine body. The disease is much rarer here than in the cervix. Its progress is by way of the Fallopian tubes and the network of lymphatics which surround the organ on all sides. The difficulties of diagnosis are very great, and not likely to be settled until the disease has advanced beyond the limits of the uterus. Other conditions closely resemble it. The mucous membrane, during its period of activity, while under the influence of pregnancy or other stimulating processes, presents an appearance very similar to that of malignant disease. Again, even the microscope cannot always enable us to distinguish between truly malignant growths and certain forms of sarcomatous polypi, which may return after removal, and ultimately cease (Hicks).

Cancer of the uterine body is of much longer duration than that of the cervix, being probably not less than three or four years. Also, while confined to the uterine tissues it is much less painful. Here, equally with cervical cancer, it is impossible to know in advance whether there be involvement of the parametria. When both body and cervix become involved, the disease will certainly have passed beyond the anatomical limits of the organ, and radical cure will be impossible.

In the earlier days of hysterectomy the operation may have been a justifiable experiment, the object being to ascertain whether it might not prove a more satisfactory and favorable method of treating cancer of the uterus than those hitherto employed. It was reasonable to suppose that such might be the case, and the efforts made to achieve a result so desirable were, doubtless, honest. But the experiment has failed. The results

which were hoped for have not been attained. The operation, instead of being more beneficial than preceding and competing methods, has been proven to be actually injurious. It has not prolonged life; on the contrary, it has shortened and sacrificed it. It has only lessened suffering in those who died. It has not only given worse results than any other method of treatment, but worse than those of the disease when left to itself. The demonstration of these facts has cost very many years of life, but it is now complete, and being so, should the destructive work go on? Shall there be any limit?

Dr. Martin, in the paper which he has read to us, propounds the following questions:

"1. Is this operation practicable with such immediate success, that it promises good results in the hands of others than a few specially successful operators?

"2. Does the extirpation of the cancerous uterus give permanent results which force us to recognize that this method is superior to any other treatment of cancer employed up to the present time?"

Dr. Martin does not hesitate to answer his first question in the affirmative, and instead of giving the results of the work of the "others," in support of his position, he only furnishes those of the "especially successful operators" of Europe—a method of argumentation calculated to mislead, because based upon only a partial presentation of the facts. This, at least, seems clear. If the 311 cases given in Martin's table show an immediate mortality of only 15.1 per cent., it follows that the mortality of the "others" which have been estimated at about 28 per cent., must be very much higher than has been supposed. Thus, Dr. Martin's statement of data seems to contradict the correctness of his conclusion.

In reply to Dr. Martin's question, "Is there any other method of treating cancer which, with so small a mortality, can show equally good results?" I answer unequivocally in the affirmative. Dr. Martin believes otherwise; and in support of his belief presents the statistics of 214 operations by Leopold, Hofmeier (Schroeder), Fritsch and himself. He excludes all the immediately fatal cases, and all those in which death occurred in less than a year, amounting to 93, and leaving 121 to be considered in answering the question. Of this number, 28 were free from return of the disease after three years, and five only, or 4.1 per cent., after four years. One has only to refer to the tables already given, showing the comparative mortality of the various competing methods and of their ultimate results, to realize the impropriety of claiming superiority in either respect for uterine extirpation.

It has been urged, if not as a reason for, at least in extenuation of hysterectomy, that, after recurrence, the symptoms appear in a milder form, and that the patient dies an easier death. I do not doubt that instances justifying this statement have occurred, but it has not been my lot to see them. In all of the cases of recurrence which I have observed, the pain, the fetid discharge, the cachexia have been as marked as in those in which no operation was done.

Certainly it is philosophical to make the best of a bad thing; and if, after operation, the death has been earlier, it is comfortable to know that it has also been less painful. Yet I am unaware that any surgeon has deliberately performed the operation for the purpose of shortening and ameliorating the patient's troubles. And why not? Such a course would be more consistent, and far more successful, than to perform the operation with the view of prolonging life.

And now, as fair and candid men, who desire to honestly administer the trust impliedly placed in us by our clients, what, in view of all the evidence relating to this matter, should be our attitude toward the operation? If there be any force in the logic of facts, our verdict can only result in condemnation.

I beg to offer the following conclusions:—

1. Cancer of the uterus is, originally, a local disease, and is curable by complete removal.

2. Any operation for cancer which does not completely remove the disease will be followed by recurrence.

3. The *extent* of cancerous disease originating in any part of the uterus cannot be known prior to or during operation; hence, no operative procedure can afford a guarantee of complete removal or of immunity from recurrence.

4. In the radical treatment of uterine cancer the most favorable results, both immediate and remote, have been obtained by the amputation of the diseased portion by means of the galvano-cautery, the hot iron and the knife.

5. Kolpo-hysterectomy is more dangerous and has given worse results than any other method of treatment. It has destroyed and has not saved life. It is an injurious and not a useful operation. It is more rapidly destructive of life than the disease against which it has been used. Hence, it should be condemned as unjustifiable.

APPENDIX.

At the request of Dr. Martin, and in accordance with my own pleasure, I append the following letter :—

WASHINGTON, September 8th, 1887.

DR. REEVES JACKSON, Chicago :—

*Dear Sir* :—In your interesting paper which you read Thursday, September 8th, in the Gynæcological Section of the Ninth International Medical Congress, you cited different statements of statistics given by me in the course of the last four years. These statements seem to disagree with those given by me in my paper read at the same meeting as yours. Allow me to give you the explanation of the striking difference.

At a prior time we had to give a total of the cases of vaginal extirpation, to show that the operation can be done safely. My total rises, up to January, 1887—up to which time my statistics extended—to about 140. At present, we must differentiate the cases, to have a real and profitable result from statistics on other questions. From these 140—this number has naturally increased considerably up to this day—different series were performed for other causes than cancer—for sarcoma, adenoma, prolapse and other different reasons. Out of the number of cases operated on for cancer, up to the time of closing my statistics, at the end of 1886, in only 66 was the disease proved to be strictly limited to the uterus; the other operations turned out either to have been incomplete, from leaving infected tissue in the broad ligaments or in the lymphatic glands high up under the peritoneum.

This way to differentiate the mass of cases in such divisions as to bring together the cases of similar nature, is the only means to make statistical statements valuable.

Believe me, yours very truly.

A. MARTIN.

DISCUSSION.

Dr. LLOYD ROBERTS, of Manchester, England, said that we were all deeply indebted to Dr. Martin for the able and satisfactory manner in which he had presented this subject, and for the great success which had attended his efforts, and we all hope that he will still continue to pursue the subject in the same able manner.

Dr. DIRNER, of Budapest, Austro-Hungary, said :—

*Mr. President, Ladies and Gentlemen* :—Allow me to read my remarks on the papers read by Dr. Martin and Dr. Jackson yesterday, being unable to speak English fluently enough to be understood. To Dr. Martin's paper I would add a report of about twelve cases of total extirpatio uteri. These I had occasion to see and to treat, as an assistant physician in the gynæcological clinic of Prof. Tauffer, in Budapest. We lost from our cases the first, which we did not perform after the method of Schröder-Czerny, and a second one of sepsis; all others performed by that method recovered, but the most only for a short time, only two surviving now, after three and four years. In those two cases I remember very well the disease had been limited

to the uterus. In some cases of relapse we could mark the bad prognosis for relapse already during the operation. In one of them disease of the kidney was the primary cause of death, as the post-mortem dissection showed. As belonging to the treatment after the operation I agree with Dr. Martin, that the best we can do is to let the wound alone. Considering so, we closed the opening in the floor of the pelvis, and filled the vagina with iodoform gauze.

Respecting the paper of Dr. Jackson, allow me to make the following remarks: He told us, yesterday, the vaginal total extirpation of the uterus is an unjustifiable operation, and alleged proofs for it. They seem for the first moment to be not only new, but fit to convince us. He told us, according to statistics from 1884, if I remember well, that from 341 cases 93 died, which represents a loss of 155 years; from the survivals died also before the time fixed so many that they represent a loss of 124 years, totally a loss of 279 years! That is a weighty argument, which is without doubt new in its form, but I think incorrect in its logic. I do not hesitate to declare that Dr. Jackson is on the wrong road when fighting with such statistics against the total extirpatio uteri.

In statistics nothing is allowed but *quantity;* as soon as we have to do also with "*quality*" statistics are at an end. That is the first rule in statistics. Allow me to give you an example: On a ship there are 100 people in danger of death. I can save but one; all the others are lost. Shall I hesitate in saving this one? Surely not. The question is very clear; I have to do here only with *quantities*. But it is quite another affair if I can save this one or more persons only by strangling 25 or more with the saving-rope. There I must count already with a "*quality*," and that question I cannot decide by statistics, but only by meditating about morality and humanity.

The poor patients with cancer uteri are such shipwrecked ones; they are condemned to death, and what a painful death, too, dying day by day, week by week, month by month! They are no longer *quantities* only, they are *qualities* already. Such shipwrecked lives it is not allowed to cast into the scale and to argue with, against the operation. The operation performed, we can save from 214 cases (Leopold 42, Schröder 46, Fritsch 60, Martin 66) 181,—more than 80 per cent.; 15–20 per cent. who died, died a short and perhaps painless death, instead of a long and painful one. All survivals after the operation can enjoy life for a short or long time; they have their life totally. And should we have saved but one life, and we can do it, we have done well. Those also who died in a short time, or in years, from relapse, after the total extirpatio uteri, had good days; they had their health, and were free from the most disgusting things of carcinoma uteri, the discharge and the ill smell, or worse. For those is the operation, if nothing else, a short but continuous relief, a better one than could be given by any other medical treatment.

Concluding, I must say humanity commands us to execute the total extirpation of the uterus, but by all means only in cases where we are sure, as much as it is possible, of being able to remove all morbid matter, and when we have at our disposition all the experience, skill and technics necessary to that operation.

Dr. A. Palmer Dudley, of New York, said: It was with much pleasure that I listened to the papers upon Vaginal Hysterectomy, read before this Section at the morning session of yesterday, by Drs. Martin, of Berlin, and Jackson, of Chicago, clearly setting forth, by well-chosen words and arguments, their views and experience with this form of operation for malignant disease of the uterus. It may possibly be presuming upon my part, as a younger man in the profession, to attempt to offer any remarks upon the subject; but, being deeply interested, I beg the privilege to be

allowed to utter one plea in favor of vaginal hysterectomy in America, and, if possible, to point out why the mortality following that operation has been so great, and especially so much larger than in Europe. True, the statistics of operation in America would seem to indicate that the operation is an unjustifiable one, and, as Dr. Jackson quotes from my paper, reporting 66 cases, 23 died; but he failed to give you the reason for this large mortality. In the 66 cases reported by Dr. Martin as having been done by himself there resulted 11 deaths, while in the 66 cases reported by myself there were 33 different operators, or an average of two operations for each operator, with a mortality for all of 34.8 per cent., and of that number (23) 11 were first and only cases, while the remaining eight are credited to four operators, one of whom had made five, two six each, and one nine operations, while several of those lost were made as a last resort only, Now we all know that experience is a good teacher, and that practice makes perfect; but, if Dr. Martin could have made his first operation as well as he made his sixty-sixth, such sayings as the previous would be sarcasm upon human experience and surgical skill; but such is not the fact, for as the child has to creep before it can walk, so has the surgeon to meet with many trials before he can possibly obtain that degree of manipulation, skill, and experience which will enable him to secure the best results with any surgical procedure for the relief of suffering. So that I claim that American surgeons have not yet had a fair trial. Most assuredly am I a believer in conservatism in surgery; but not to the extent that while we wait for the operation to become justifiable we allow our professional brethren in Europe, by careful observation and experience, to pile up statistics of successful results, to which we can never afterward attain, as is the case in ovariotomy,—an operation which originated in this country; and still at the present day our surgeons are almost flocking to Europe to see how it is done.

I would plead for a careful consideration of this operation in America for still another reason, which seems to me to be a valid one. That is, the amount of suffering and manner of death from cancer of the uterus, for we all know that after such an operation, if death takes place, it is painless, and if the patient recover and has a return of the disease, its course is much more rapid and less offensive. For that reason it is to be recommended. Dr. Jackson, by an ingenious mathematical calculation, summed up a loss of life (from this operation) amounting to nearly three hundred years; but, if he could have summed up the amount of suffering that these poor creatures would have to undergo before the slow but gradual death relieved them, he could have easily run up what would seem to them to be thousands of years, and had before his vision many a woman who had not only become loathsome to all her friends and relatives, but actually loathsome to herself; and in many of the cases I have reported the patients have not only readily assented, but craved the operation. One patient, when told that she would surely die, and that such an operation seemed like murder, declared that she would ask no greater pleasure than to act as the star in such a tragedy, if it would only relieve her suffering.

It is my belief that, so long as cancer of the uterus shall appear in America in the future, so long will vaginal hysterectomy be resorted to for certain forms of the disease; and may such operations so increase the operator's skill and experience that ere long we shall be able to show statistics equal to, if not better than those given us by Dr. Martin, of Berlin.

Dr. Nunn, Savannah, said there was always a starting-point to cancer. It is generally due to neglect of fissures or some other irritant arising consequent to parturition. In his own practice he has his patients report to him occasionally after de-

livery, and sees that they take care of themselves properly, and he has not had a case of cancer among his own patients.

Dr. GRAILY HEWITT, of London, said that the whole civilized world, and the uncivilized too, were under obligations to Dr. Martin and his colleagues for their work in this line, they having advanced the operation to its present state. In a discussion in the London Obstetrical Society, a few years ago, the speaker was the only one who refrained from condemning the operation. He thought it should be done in carefully selected cases and by skillful and experienced men.

Dr. MARTIN said he was accustomed to prepare his patients for operation with the most thorough antiseptic vaginal injection. He described minutely the details of his method. He very frequently opened Douglas' pouch at one stroke of the knife. He is thus able to see the posterior fornix and cut carefully, guided by the finger nail. When the peritoneum is opened, he introduces one finger into the cul-de-sac, and having warm water running over the surface, does not use sponges, and sutures the vagina to the peritoneum. When he had freed the broad ligament by deep sutures, he cut it from the uterus, and generally had no hemorrhage. He then proceeded in like manner on the other side till he had the broad ligament severed there also. He then commenced on the bladder, freeing it with the scissors or knife. After it was freed he united the cut border of the vagina with the peritoneum, as before. He was accustomed to insert a drainage tube of india rubber into the peritoneal cavity. He thought it did good; although he believed a case not infected should be closed up. Yet he had such good results from its use, he still continued it. There were various gentlemen present who had seen him operate, and who could testify that he lost a very small amount of blood. There are cases where, from the conditions, it is otherwise. The operation was yet new; it had only been done six years; he believed he should improve upon it more still.

Dr. E. CUTTER, New York, said: For the cases which Dr. Martin had reported as not adapted to excision, he would suggest a diet of the Salisbury plans, of beef chopped in the American chopper and then broiled. He referred to a pamphlet on "Diet in Cancer," in which six cases of uterine cancer were published where a following out of these plans gave beneficial results. One of these cases was that of his wife, whose father died of cancer of the stomach, and whose great-grandmother died of cancer of the breast. Had Mrs. Cutter died, there would have been no doubt as to the diagnosis. Her present restoration to health, he said, was a living argument he could not ignore nor refute. And her case was what gave him the moral courage to make known the contents of this paper. He asked a reference to the paper, which he would send on application to any one, as he preferred the subject to be judged from the printed page, rather than from his desultory remarks. As to cancer, he said he regarded it as tissue under mob law in the body systemic, as we have mobs in the body politic. There are laws that govern tissue nutrition and development, else why do not our hands grow ten feet long, or a plum tree one hundred feet high? "Cancer" meant "Crab," and was a poor name. He hoped that a better nomenclature would be adopted for one which was so defective. The nutrition being put on a healthy basis, there is a chance to approach the disease from centre to periphery, in the very substance of the tissues, and the authority of the government of the body systemic becoming restored; with its restitution disappears the violation of the laws of nutrition.

Dr. JACKSON, closing, said: It has been urged, during the discussion to which we have listened, that the argument which I have used to show the amount of life

destroyed by hysterectomy is unfair. In reply to this, I have only to say that the facts upon which the argument is based have been furnished by such observers as have been named—Paget, Gusserow, Seifert, Sänger—and, if these facts be accepted as true, no other result can be fairly reached. And are they not accepted? Is their accuracy disputed?

The "shipwreck" argument is ingenious, but it contains a palpable fallacy. The situations are not analogous. Undoubtedly it would be a duty to save one imperiled life out of a hundred, even though the other ninety-nine were beyond rescue. But if the entire hundred endangered persons could live an average of twenty months, and it were necessary to drown one-third of their number in order that the others might live *fourteen months*, the life-saving system would be as expedient and justifiable as hysterectomy in the treatment of cancer.

Dr. Dudley, while advocating the operation, seems to do so, partly at least, on the ground that our young men ought to learn how to do it. Certainly the table recently published by him, showing a mortality of over thirty per cent., and to which I have referred, would seem to show the urgency of their need. The result is surely bad enough; but if he had included only the additional Chicago cases, reported to-day for the first time, he might have shown that we are able to do still worse.

In discussing this subject, it seems to have been forgotten that the question is not whether women suffering from uterine cancer shall undergo hysterectomy or be abandoned, but, rather, whether they shall submit to this, the most dangerous method of treatment, or to some other which is less dangerous and which has, at the same time, produced *better results*. This is the real issue, and it should be fairly made.

Whenever the advocates of hysterectomy shall be able to show by a greatly lessened operation mortality, and by its ultimate results, that it is the better method of treating uterine cancer, or that it cures more than it kills, I shall be willing to join them in conceding its justifiability.

Dr. MARTIN replied that he knew that a cancer was limited to the uterus by its having a layer of healthy tissue about it, as proved by microscopic examination of the cut surfaces after extirpation.

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# VAGINAL HYSTERECTOMY FOR MALIGNANT DISEASE. THREE CASES OF RECOVERY.

## HYSTÉRECTOMIE VAGINALE POUR MALADIE MALIGNE. TROI CAS DE GUERISON.

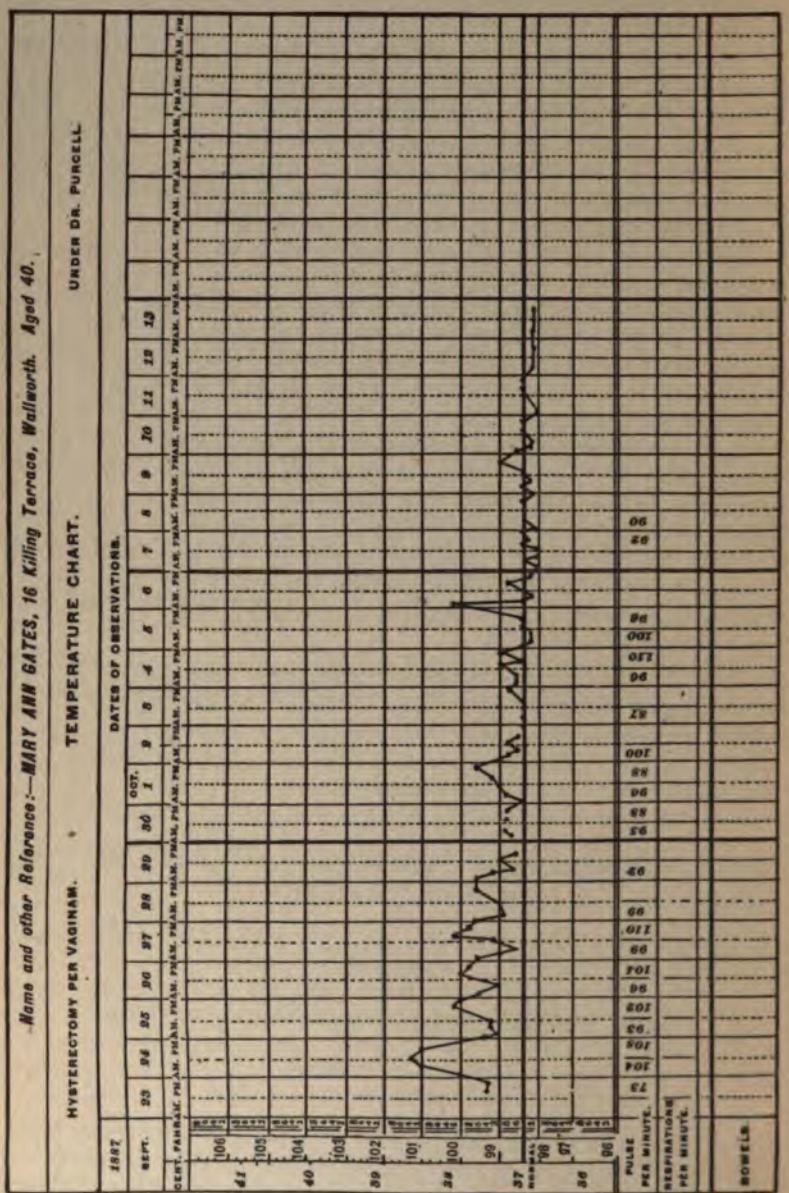
## VAGINAL HYSTEREKTOMIE BEI MALIGNEN ERKRANKUNGEN.

BY DR. F. A. PURCELL,

Surgeon, Cancer Hospital, Brompton, England.

CASE I.—Mrs. M. A. G., aged forty; married. Was admitted to the Cancer Hospital, September 15th, 1884. A strong, well-nourished woman; the mother of five children; youngest, four years old; no family history of cancer. Her illness dates five months back; three weeks ago she had a small growth removed from the os by Dr. Archer. She now complains of pain at the bottom of stomach, has difficulty in walking and suffers severely.

The vagina is occupied by a papillomatous growth, arising from the os, extending on to the left vaginal wall ; exceedingly vascular ; bleeds on the slightest digital examination.




On September 23d she was anæsthetized by Mr. Bailey and placed in position, the platinum wire was manipulated around the base of the tumor, on a line of the internal

os, and the galvanic écraseur fixed; the growth was removed without loss of blood—in size, about that of a cricket ball.

On examination, it was found that all the disease was not removed. It was, with the consent of my colleagues then present, decided to proceed to extirpate the whole organ; using cleanliness and all other antiseptic precautions, the peritoneum was opened in the anterior vaginal fornix ; the fingers passed over the fundus, turned it down anteriorly; it was brought down with comparative ease; a silk ligature was passed, by an aneurism needle, around the broad ligament (taking care to avoid the ureter) on the left, and tied, and the distal end clamped with pressure forceps, and divided; the left ovary and some pale yellow fat came into view; still drawing down the fundus, the right ovary then presented, and was found in a cystic condition, about the size of a hen's egg; was tapped, and gently drawing it down, it was followed by its Fallopian tube, along which was seen several smaller cysts; the broad ligament was tied and clamped with pressure forceps, and divided; the ureter was guarded against being included. The uterus and its appendages were still held by the walls of the vagina; these being diseased, were peeled down, and, fixing the galvanic écraseur around, were severed and released.

Free bleeding from several of the posterior vaginal vessels, one very large, gave trouble. My colleague, Mr. Jessett, passing his finger into the rectum, stretched parts into view, thus enabling the bleeding vessels to be seized; the toilet completed, a glass drain was inserted and wool tampons, iodoformed, were placed around the tube; the operation lasted an hour and a half. No attempt was made to bring the peritoneal edges together. A self-retaining catheter was inserted into the bladder.

The specimen, the uterus with its appendages, was shown at the Obstetrical Society on the 14th of January, 1885, when other cases were also shown, and a paper was read by Dr. Wm. A. Duncan, on vaginal hysterectomy.

The bowels were first moved on the thirteenth day, causing the only rise of temperature (100.2° F.) that took place after the first five days from the operation. The temperature on the day after the operation rose to 101.4° at noon, falling on the third day to 99°; and varied from 100° to 98.6° until the sixth day, when it dropped to normal, except the rise above noted, on the thirteenth day, when the enema was administered; the catheter was removed altogether on the morning of the sixth day. For some little time she was troubled with vesical irritation. She was allowed up on the twenty-fifth day after the operation; she ate well; all stimulants were discontinued after the fifteenth day. On examination, parts were found healthy and smooth; the transverse cicatrix is felt in the vaginal fornix ; no special contraction of the vagina. She was discharged from the hospital on November 4th, forty-two days after the operation.

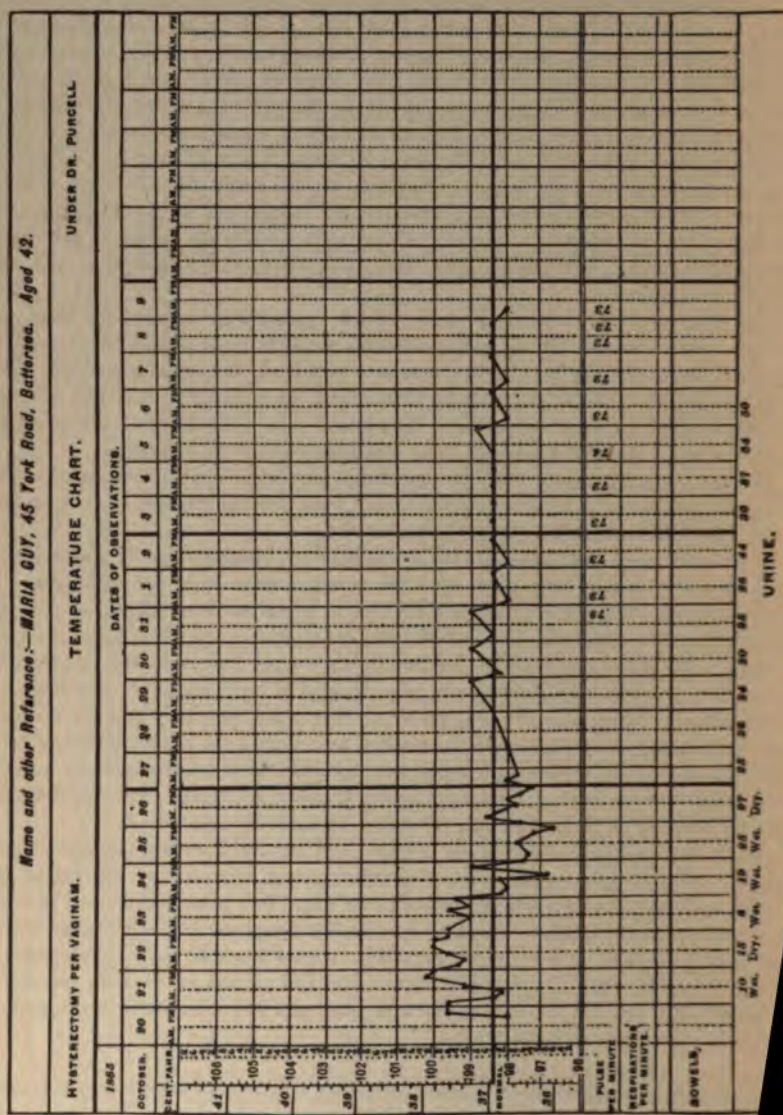
On December 8th she came to the hospital, and remained during the night, so as to give my colleagues an opportunity of examining her; the walls of the vagina were smooth and no recurrence was anywhere to be felt. She presented herself afterward on several occasions, the last time six months after the operation. By a letter received from a daughter, I learn that death occurred on August 7th, 1885, being ten months and a half after operation. The daughter says: "Her life, as long as it lasted, was enjoyed by the whole of us." I fear recurrence took place and was the cause of death, although I have no absolute data for saying so.

CASE II.—Mrs. Maria G——y, aged forty-two, married; admitted into the Cancer Hospital, October 16th, 1885. A thin, delicate woman; the mother of six children; has been losing flesh; in April last believed herself pregnant; in July had a flooding, and again another a week previous to admission; these and her general wasting and declining state of health made her seek advice. She has no family history of cancer.

A growth was found occupying the vagina, coming from the posterior lip of the os,

tending on the neighboring posterior wall of the vagina; the uterus is enlarged, freely movable; no extension or infiltrated glands to be felt; the broad ligaments appear healthy.

Extirpation of the uterus suggested itself, and the operation was proposed and duly explained, and having consulted with her husband and friends, the patient consented.




Accordingly, on Oct. 20th she was anæsthetized, and being put in position, Hay Smith's duckbill speculum was inserted in the posterior fourchette of the vagin the uterus was drawn down by means of a hook fixed in the anterior lip of the o incision was made through the mucous membrane around the neck, well ab

disease, and which was dissected upward; here my assistant laid hold, as he thought, of the uterus with a vulsellum, which tore out; some water began to flow; an accidental tear into the bladder was recognized; attention was at once directed to rectify the misadventure; the rent admitted the point of the finger, which exposed a second rent; both were carefully closed with seven very fine silver-wire sutures; the bladder, being tested, was found staunch; the peritoneum was entered anteriorly and the uterus drawn down by the fingers; the broad ligaments were separately encircled with No. 4 silk; the ureters searched for and found not present; the ligature was tied and the clamp forceps applied; parts were divided; no bleeding of any moment took place; the vaginal wall where it was infected was dissected down and the diseased portion removed; the vagina was douched out; a glass drain inserted, around which wool tampons iodoformed were plugged; a self-retaining catheter was inserted into the bladder. No attempt was made to bring the peritoneal edges together.

That night the catheter fell out; the draw sheet was found wet; house surgeon drew off half a pint of urine; the bladder rents appeared staunch; the vaginal drain and the catheter in the bladder were connected with separate basins under the bed; the ends of the tubes were weighted under carbolized water; the tampons were renewed and parts dusted with iodoform.

Oct. 22d, second day. Draw sheet was dry after the night; fifteen ounces of urine passed through drain, and about two ounces of dark catamenial discharge oozed through vaginal drain; parts are syringed out with iodine water (ʒ iss of the tincture to Oj); the bladder is syringed with same.

Oct. 23d, third day. Draw sheet wet; five ounces urine drawn off and eight ounces passed by the drain.

Oct. 24th, fourth day. Draw sheet wet; nineteen ounces urine passed per drain.

Oct. 25th, fifth day. Draw sheet wet; 25 ounces per drain; catheter had fallen out.

Oct. 26th, 27th, 28th was dry; average of 26 ounces of urine passed per drain, sp. gr. 1025; a muco-purulent deposit; the iodine water has regularly been injected into bladder and vagina. Moved into general ward.

Nov. 1st, ninth day. Dry; 38 ounces urine saved; two grains of quinine to the pint of water injected into bladder instead of the iodine water.

Nov. 2d, tenth day. Catheter wholly removed; allowed to pass water of herself.

Nov. 20th, thirty-first day. Intending to leave hospital to-morrow, parts are examined; the vaginal walls have cicatrized, forming a cul-de-sac; the wire sutures remain in situ; urine is clear and normal, free from albumen.

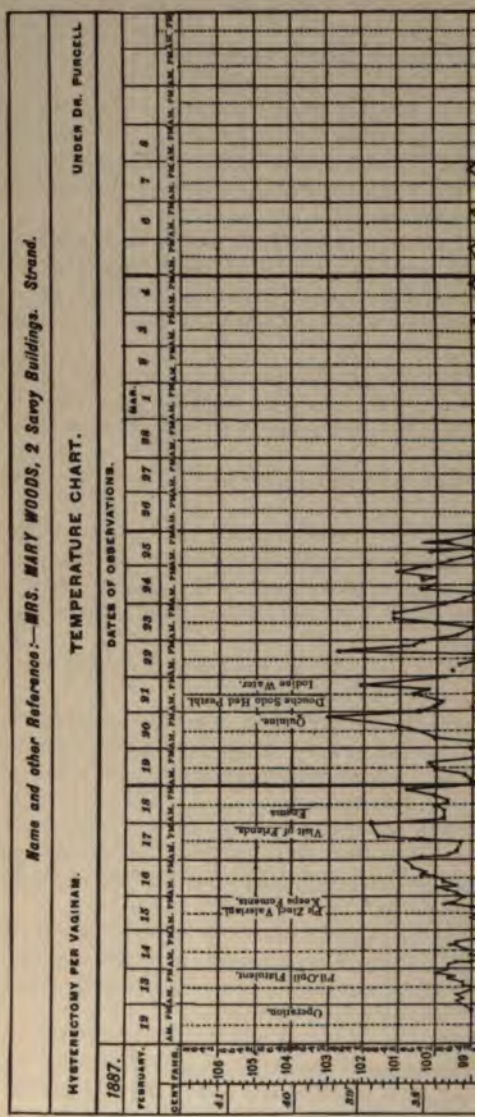
Temperature the night of operation was 99.6°; next day fell to normal, rose in the afternoon to 100.2°; the third day varied from 99° to 100°; the fourth day from 99° to 99.6°; fifth day, morning, 96.8°; evening, 99°; sixth day, 97.8° to 96.6°; seventh day, 97.2° and 98.6°; eighth day and after it was normal.

The specimen—the uterus and appendages—was shown at the British Gynæcological Society on the 25th November, 1885. Epithelioma extended on the posterior lip of the os and along up the neck, the walls of the vagina were affected laterally, a probe passed to the fundus measures a depth of two and one-quarter inches.

This patient left hospital with the sutures in, and had connection with her husband on her return home, which she confesses was constantly repeated; eventually I removed the sutures, and to this day this patient is free from any recurrence, and has improved greatly in appearance.

CASE III.—Mrs. Mary W.; married; aged twenty-nine; admitted to Cancer Hospital in February, 1887. The mother of five children, the last five years old; had good confinements, with good gettings-up, and suckled them all; youthful looking and of pleasing countenance; placid disposition, but by no means a robust woman. Husband is a

sailor; has no family history of cancer or syphilis. C
months suffered from a dirty, watery discharge from
and two months back had two floodings, and another
under treatment at Soho Square Hospital for Wom




for the last three months. For want of a bed she
Hospital.

A large growth fills the vagina; origin from the ant
surface; ulcerated at its depending portion; posterior li

ing up the neck of the uterus, and also on to the vaginal wall; the broad ligaments seem healthy and no abdominal glands are to be felt enlarged.

The nature of the operation was duly explained, and on February 12th patient was anæsthetized by Dr. Bowrus and placed in position; the vagina being douched out with carbolic water, the bladder emptied, the catheter retained, when the platinum wire of the galvanic écraseur was encircled around base of tumor; a large curved needle (Wood's hernia needle) was passed through the neck to act as a guide; on working the écraseur the wire broke; the mucous membrane was then divided with Emmet's scissors, and the separation of the growth was completed, on a line with the internal os; it was not clear of the disease, and it was evident that nothing less than total extirpation would get beyond it.

The peritoneum was opened in the anterior fornix, the bladder lifted out of the way, the finger, making room, was passed behind and above the broad ligament on the left; here, to make sure that the ureter was free, the structures were passed along in view on the finger and closely examined; an aneurism needle armed with No. 4 silk was insinuated around on the finger; the ligature included the broad ligament *en masse*. To prevent slipping of the ligature, and to prevent secondary hemorrhage, two pairs of pressure forceps were applied close up to the ligature; the structures then divided with scissors; parts receded, carrying with them the forceps; the uterus was now anteflexed and gently brought down; the left ovary came down; a sponge was passed up to keep back the bowel; the right broad ligament was examined and found to be free of the ureter; tied, clamped and cut; the right ovary and Fallopian tube now came down. The vaginal wall, posteriorly diseased, was dissected down by the finger nail, and by a snip or two of the scissors the mass was removed; some bleeding gave a little trouble; forceps and sponge were all removed; parts douched out and cleaned and dried; iodoform was dusted and two wool tampons, iodoformed, inserted, thus completing the operation. A duck-bill speculum held posteriorly and laterally, the fingers of my assistants on each side, kept the vulva dilated.

The specimen (the uterus, two ovaries intact and right Fallopian tube, the neck and body infiltrated with scirrhus; some small cysts dotted the fimbriated extremity of the Fallopian tube; scirrhus verified by the microscope) was shown at the meeting of the British Gynæcological Society on the evening of March 9th, 1887.

11 P.M. Patient is found comfortable. The two tampons were removed; the uppermost one, on being brought down, had the bowel adherent to it; being freed, the bowel receded back; a glass drain was inserted; parts dusted with iodoform and urine drawn off; pulse 90; temperature 99.6° F.

13th, A.M. Slept two hours; partook of iced water in small quantity; vagina gently douched out with corrosive sublimate solution, 1 in 5000; tube washed, reinserted, and iodoform dusted on; highest temperature, 99.4.°

P.M. Slept at intervals; slightly sick; little brandy and iced water was given; troubled with flatulency; temperature from 99.2° to 100.°

14th, A.M. Slept; was given a teaspoonful of Brand's essence of beef jelly every hour; troubled with wind; vomited small quantity of mucus; temperature, 99.6° to 98.6°.

17th, A.M. Has passed since last record very comfortably; troubled with flatulency; discharge from vagina not been much; toilet as before; an enema administered causes the bowels to act; stomach not distended; urine all through has been drawn off.

20th. Has slept well; stomach flat; vaginal discharge during last night has been more than usual, and has a fecal odor; on the vagina being syringed some fluid escapes by the rectum during the operation. I now remember, when passing the curved needle through the neck of the uterus, its point got slightly inserted into the posterior wall of the vagina, perhaps pierced through into the rectum. This may have ulcerated and admits the water; I cannot find it, however.

21st, A.M. Bowels moved twice during the night. Vaginal discharge is colored and has a fecal odor. The speculum was passed, and parts douched freely out with the corrosive sublimate solution 1–5000; parts appear smooth, bowel to be seen above, no communication to be seen. A wool plug six inches long, about as round as a finger, was passed up the vagina and kept in situ for two hours; on removal its upper end was found stained with dark-colored matter and having a fecal smell. An India-rubber drain is substituted for the glass as being less hard. Iodine water (ʒ iss of the tincture of iodine to a pint of tepid water) is now used as the douche.

23d. Going on satisfactorily; had a fish dinner.

25th. Discharge is now purulent and thick, lighter in color. Parts are soft and smooth, the fornix is cicatrizing across, bowel not to be felt.

March 8th. Patient has been up every day since the 4th; passes urine of herself. Vaginal discharge completely ceased; no pain anywhere; fornix is cicatrized properly; anterior wall of vagina measures about two inches, posterior three inches; quite convalescent, being her twenty-fourth day after operation. Discharged well.

These three cases all occurred in my practice at the Cancer Hospital, and are the only cases in which I have tried extirpation of the uterus per vaginam.

### REMARKS.

Blundell, in the year 1828, was the first in England to perform and carry out successfully total extirpation of the diseased uterus by the vagina; his patient lived one year; the subject has been a moot point among gynæcologists in England ever since. Dr. West propounded: "the unanimous voice of the profession has pronounced it to be over-bold, and has rejected it from among the legitimate operations of surgery." Mr. Knowsley Thornton, a bold, skillful and successful operator, more recently says: "The immediate results must be totally different from those at present obtained, and the after results also, before the operation could be admitted to a place among the legitimate operations of surgery." "Dr. A. Reeves Jackson, of Chicago, in a paper read before the American Gynæcological Society, held in Philadelphia, endeavored to show that complete removal of the cancerous uterus should be discarded from practice, because it is a highly dangerous procedure, and holds forth no reasonable hope for permanent relief."

To the German surgeons belong whatever credit is due for its modern revival. Their results were known to be much ahead of those obtained in England, where they had been bad; the German mortality may be put down as from 28 to 32 per cent., and gradually improving.

Dr. Schroeder, of Berlin, whose recent death we have to deplore, up to 1884 lost eight out of twenty-seven patients in whom he performed vaginal hysterectomy, equal to 29.6 per cent., and admitted that in his practice "it is not yet to be called satisfactory, especially as far as the question of recurrence is concerned."

Prof. Olshausen, up to 1883, performed, or attempted to perform, vaginal hysterectomy twenty-eight times; in twenty-five the operation was completed; seven of his patients died, equal to 28 per cent.: two on the day of operation; three of septicæmia on the second and third days; one of carbolic poisoning on the second day; one of iodoform poisoning on the sixth day; one, suddenly, of embolism of the pulmonary artery on the sixth day; of the seventeen remaining cases, in two no return took place for one year; in two, two years had elapsed without return; in four or five a recurrence had taken place.

Martin, in a letter dated April 12th, 1884, gave an account of 60 cases in his practice, of which 13 died, equal to 21.7 per cent.

Haidlen, in the year 1881, collected 52 cases, of which 19 died, a mortality of 36.6 per cent.

Czerny, in the year 1882, collected 81 cases, of which 26 died, a mortality of 32.1 per cent.

Sänger, of Leipsic, collected 133 cases, of which 38 died, a mortality of 28.5 per cent.

Dr. William A. Duncan, of London, collected from all sources, up to January 14th, 1884, 276 cases, of which 79 died, a mortality of 28.6 per cent.

Let us contrast this with abdominal hysterectomy.

Hegar and Kaltenbach collected 93 cases, of which 63 died, a mortality of 67.7 per cent.

Dr. William A. Duncan, of London, collected, up to 1884, 137 cases, of which 99 died, a mortality of 72 per cent.

Abdominal hysterectomy, or Freund's operation, is, therefore, a very fatal procedure.

Mr. K. Thornton, in his observations (*British Medical Journal*, October 13th, 1883, p. 713) on his Class 2 (intra-mural fibro-myomata), says: "Operations for the removal of such growths by abdominal section are serious and dangerous; the operation nearly always involves opening of the uterine cavity, and we are at once exposed to risks of septic conditions. The result is seen in an immensely increased mortality, a mortality still so great that we must pause here and carefully consider what are the conditions which justify us as surgeons in performing these formidable hysterectomies and partial hysterectomies. There can be no doubt that since it has been generally recognized that operations in which the uterine cavity is opened should be concluded by bringing all the cut surfaces outside the peritoneum, the mortality has sensibly diminished. . .Those operations involving the opening of the uterine cavity should not, in my opinion, be undertaken unless the life of the patient is actually in danger from hemorrhage, rapid growth of tumor, or interference with the function of the bowel or other vital organ. . . I shall," he continues, "not again in any case attempt a partial hysterectomy, as I am convinced that it is both safer and easier to remove the whole organ, and deal with the cervix instead of the uterine wall."

Sir Spencer Wells agreed generally in the above.

We are now seeing established in legitimate surgery the operation of extirpation of the uterus for uterine fibroids, and it is to be hoped that we may regard the vaginal extirpation of the cancerous uterus as an eminently rational one in an affection so surely fatal when left to itself as carcinoma, claiming for it no more nor less than what is to be expected from excision of the tongue, the rectum, the breast, etc.

We certainly may hope that this operation will follow the lead of the other gynæcological operations, showing a better prognosis as soon as the technical methods become more perfect.

Like ovariotomy, vaginal hysterectomy is progressively improving in its death rate, and should therefore be persevered in, with the hope that it will eventually become a far more successful measure than it has proved to be up to the present date.

Far be it, that I should argue on my own three successful cases, for the number is not to be compared with those who operated so largely.

The question, whether it is possible to operate radically, is that which may be well asked; this may indeed be difficult to answer, and it would be an illusion to suppose it possible to decide it with the utmost certainty; prognosis will be confirmed, but not with absolute certainty, by the microscopic examination; "time" is the only element which can prove the completeness or incompleteness of removal of the whole malignant structure.

It is a question whether it is advisable to undertake extirpation if there be superficial primary cancer of the vagina, for where extensive parts of the vagina are attacked, the deeper tissue will always be found diseased, and the operation will (most probably) not be radical.

Cancer of the cervical mucous membrane and of the body of the uterus always necessitates total extirpation of the organ.

Of the final results of the vaginal operation our information is scanty, and requires a more rigid following up of each case; freedom from recurrence on an average may be placed at fourteen months, which, if extended to two years, a cure may be taken credit for.

The prognosis will no doubt improve by and by, especially if the operation be performed early and radically. Besides, even if the recurrence takes place, as Dr. John Williams, of London now willingly acknowledges, the patient suffers little toward the end of life, compared with the dreadful sufferings produced by ulceration, for the disease generally does not recur on the cicatrix in the vaginal fornix; it spreads upward on to the pelvic cellular tissue and saves the patient from the dreadful symptoms of cancer, from hemorrhage and ulceration.

Sänger holds the views that partial operations on the cervix should be reserved for those cases of malignant papilloma in which the growth projects into the vagina; that supra-vaginal amputation of the body of the organ after laparotomy, or Freund's operation, should be limited to those cases in which the diseased organ cannot be removed through the vagina; and that vaginal hysterectomy should be the rule in all other examples of carcinoma.

In papilloma the superficial area of the vaginal mucous membrane is first implicated; then the epithelial glandular cell infiltration toward the rectum and bladder, with extension of the papillomatous growth along the cervical mucous membrane toward the uterus and uterine cavity. Papilloma, or the so-called cauliflower excrescence, or cancroid, is the form of disease the early removal of which results in complete cure; but, when left to follow its own course, the result is similar to carcinoma.

The former begins on the surface, while the latter has already made extensive progress in the deeper tissues, before it reaches the surface and ulcerates. By the time it has done so, neighboring parts have been infected, and extirpation is of no avail.

Herein lies the vital importance and necessity of seeing and operating upon cases in their initial stages, if women are to be relieved from misery and suffering.

The frequency of the disease commencing in either lip of the os and of the cervix, makes the question of treatment one of ever persistent importance; the disease is manifestly localized and not general in many cases, and a hope of cure is therefore not to be absolutely denied.

Practice seems to have separated itself into two widely divergent lines: on the one hand, to treat the disease by extirpation of the part or of the whole organ; and, on the other hand, to remove the disease only in those cases in which a protuberant mass presents itself, namely, the partial operation on the cervix with the application of Paquelin's cautery or some escharotic.

This latter practice implies abandonment of some women whom a more hopeful view might have helped to cure, and very many of whom might have been relieved, not reckoning, of course, the immediate risks of the operation, which, before being undertaken, should be explained fully to the patient and her friends, as a safeguard for the operator.

Dr. CORDES read for Dr. VUILLET, Geneva, Switzerland, a paper—

## ON THE BURIED SUTURE IN THE OPERATION FOR VESICO-VAGINAL FISTULA.

### SUR LA SUTURE ENFONCÉE DANS L'OPÉRATION POUR FISTULE VÉSICO-VAGINALE.

### ÜBER DIE VERSENKTE NATH IN DER OPERATION FÜR BLASENSCHEIDENFISTELN.

In the autoplastic operations which are made on the vaginal walls when we want to unite large surfaces, there is, in my opinion, great advantage in making two lines of sutures instead of one. The first one unites the tissues near the median line; the second one closes the wound by bringing in contact the edges of the pared surface. They are made one after the other with the same thread. The first one is a lost or buried suture, which must be encysted and absorbed; the second one may be taken away. The lost sutures are only to be used in a perfectly disinfected medium. Besides, they must be made with a wire or thread susceptible of remaining an indefinite time in a tissue without being contaminated by the germs which cause suppuration and decomposition. I will not make any comparison between the different materials which can be used in such cases. I wish to mention only the one which I use, as being, in my opinion, by all means the best. Around a glass bobbin I wrap a silk thread, disinfected, which I immerse and leave for some time in the following solution: iodol 10, alcohol 40, glycerine 50. After a few days the iodol will have penetrated all through the silk. I take the thread out at the very moment when I am going to use it. As soon as it is exposed to the air the alcohol evaporates; the glycerine and iodol make a viscid coating around the thread. The thread has lost neither solidity nor suppleness, but it has become quite resistant to septic decomposition for a time longer than is necessary for the union of the wound. This iodolized thread had given me such satisfactory results in colporrhaphy, that I thought of trying it in the vesico-vaginal fistula operation. In both these operations the result aimed at is coaptation on the median line of the peripheric bleeding surfaces. In one case we want to bring the parts into perfect coaptation; in the second case, we want to fill up the loss of substance. An occasion of applying this new system presented itself to me last January. The patient had been unsuccessfully operated upon three times, the first two times in the private clinic of one of the masters of modern gynæcology. The fistula was situated half-way between the meatus and cervix. The urine flowed through three small apertures situated on a space as large as a ten-cent piece. This space was occupied by cicatricial tissue resulting from the previous operations. It formed a very thin screen, quite incapable of furnishing the necessary elements of a good cicatrization. I made up my mind to take this tissue away. I operated in Sim's position. I pared, by centripetal dissection, eight millimetres of tissue (one-third inch) at the periphery of the cicatrix. The flap was detached in one single piece. I then planted, at each extremity of the antero-posterior diameter of the loss of substance, bullet forceps, on which my assistant pulled in opposite directions until the lips of the fistula were brought quite in contact. Then I took a very small needle threaded with a very fine iodolized thread. I made on the edges of the fistula a continuous suture with stitches very close together, as we do when uniting the wounds of the bladder or intestine, doing it in such a way that the coaptated lips were turned inside the bladder, and the coaptation was so perfect that no liquid could flow out even in the effort of coughing or vomiting, the effects caused by ether. When this first suture was terminated, I washed the pared surface with a sublimated solution of one part in a thousand, and I made the second suture under

perfectly aseptic conditions. After seven days I took when I found that the wound was united by primary i draw deductions from one single case which will lead to of union. I believe, however, that I can conclude fro supplementary suture applied on the edge of the fistu cases, insure, better than the single suture, the definit fistula.

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## VASCULAR GROWTHS OF THE FEMALE

### EXCROISSANCES VASCULAIRES DU CANAL U

### ERECTILE GEWÄCHSE DER WEIBLICHE

BY AUGUSTUS P. CLARKE, A. M.

Cambridge, Mass.

Vascular growths which usually occur near the meat the most common neoplasms that invade the female ur much suffering, and the treatment employed for their amelioration of the suffering has often proved quite un for the appearance of these growths has not been s authors call the growth a caruncle, while M. Gosseli growth a *polype cellule vasculaire du méat urinaire.* M. G from a common polypus in its structure not being so fibrous and muscular tissues. The growth also differ remarks, by the peculiarity of the pedicle. The vascula shaped and appears as an excrescence, highly injected, a tributed a peculiar arrangement of cells and tissues w exalted state of hyperæsthesia. Some authors † have conj pathetic must undergo some peculiar change in their int these growths, that they are capable of producing such placed and gravid uterus pressing upon a venous plexus o may induce urethral hyperæmia, and consequently give The growth is surmounted with basement epithelium, an no doubt causes an undue and altered development growths do not always make their appearance at the me tance within the urethra.

Authors are not agreed as to whether nerves enter ir vers‡ claiming to find a free distribution of nerve elemer have denied the presence of the nerve element altogethe sensitiveness is in any part of their own tissue,§ but

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* Clinique Chirurgical hôpital, de la Chárité Service de M Juillet, 1876.

† Emmet's "Principles and Practice of Gynæcology," 187

‡ "Diseases of Women," 1879, by Lawson Tait, F. R. C. S. Medical Authors."

§ "Vascular Tumors of the Female Urethra," 1877. By A

mucous membrane to which they are attached, do the nerves fibres enter. There are still others who have made very careful investigations, and, though they do not deny the presence of the nerve tissue, they have failed to find it. That these growths are penetrated by nervelets, some observers maintain, is evidenced by the fact that even when lightly touched, without influencing the basement membrane, extreme suffering often results. Skene mentions a case of an old lady, who, though married, was still a virgin. The growth was so exquisitely sensitive that coition was impossible. Even the clothes coming in contact with the parts produced vaginal and anal spasms. Pepper* refers to Hart and Barbour,† who define these neoplasms as "consisting of dilated capillaries in connective tissue, the whole being covered with squamous epithelium." Skene ‡ says one case is recorded in which the pavement was replaced by the columnar epithelium. Nerve tissue entering into the structure of these growths has long been believed to be a fact. Thus, J. Braxton Hicks § remarked that the difference in the suffering depends whether the sensitive papillæ (Pacinian bodies) are hypertrophied or not. In some the growth of the vascular element is in excess, in some—the majority—the nerve tissue; in others the basement layer. In those which are most sensitive the Pacinian bodies are hypertrophied and distinct. The beautifully injected state of these growths can be seen to the best advantage when they are carefully removed by the snare or wire noose. Reference to the anatomical structure of the Pacinian corpuscles, as they are situated on the peripheral extremities of the nerve fibres in their various localities, and especially in the perineum, and in the bulb and meatus of the urethra, will readily explain why such exquisitely acute sensibility is experienced when these little pyriform masses have undergone a prolonged and marked pathological change, and the reason why, even after extensive excision, unless the parts are thoroughly cauterized, repullulation so often ensues. Jonathan Hutchinson‖ says that these growths often cause very serious constitutional disturbance, and that in one case he knew urethral or urinary paraplegia to result. Erichsen¶ speaks of these polypoid tumors as occasionally being of a gonorrhœal origin. He says they are composed of a spongy kind of erectile tissue, and are not unfrequently accompanied by a vast deal of sympathetic irritation. It is said that the erectile element often markedly increases at the menstrual period.** The nature and structure of these growths should not be considered so much a question of literary curiosity, as of one affecting prognosis and the causation of other morbid processes, such as insanity, epilepsy, etc. Professor Gosselin says we should always consider the question whether they are of a benign character, and also whether we can generalize and refer them to an infectious and septic class of diseases, especially when they are prone to suppuration. Sir James Y. Simpson†† was the first author who brought the disease into prominent notice, although, upward of fourscore years ago, Sir Charles Clarke, in his work on diseases of women, gave a description of an abnormal growth occasionally occurring at the meatus urinarius.

The little tumors which that author described were of a reddish color, and raised above the surface of the urethral mucous membrane. They were prone to bleed and were the cause of much dysuria. The same affection is also mentioned by earlier writers, but their descriptions are, for the most part, very vague and indefinite. Authors are now quite well agreed upon the nature of these growths being benign. In the cases in which

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* William Pepper's "System of Medicine," 1886. Vol. iv, page 403.

† "Manual Gynæcology," 1883. Edinburgh.

‡ Skene's "Diseases of the Bladder and Urethra in Women."

§ "Braithwaite's Retro." Part 56, page 261.

‖ "Surgical Diseases of Women." By J. Hutchinson, Esq., F. R. S., London. Vol. 2 Holmes' "System of Surgery," 1881.

¶ Erichsen's "Science and Art of Surgery."

** Skene, op. cit.

†† Also mentioned by A. R. Jackson, in his article referred to.

repullulation ensues, it occurs in the parts nearest the gr
first does not show itself; but where later it becomes de
blance of malignancy. Their disposition to bleed from
friable and vascular character, often impresses the patient
the subject of a malignant disease. As already stated, t
much suffering. Cases of temporary insanity have been
severe local and constitutional symptoms. Cases occasi
lesions or morbid processes are present, and which are n
the suffering until the patient is nearly worn out or has b
the cases reported attention was at first directed to the
ages, and, in fact, the whole routine of treatment has be
least benefit, until the removal or destruction of the lit
train of ills disappeared, as by magic. Goodell says the
after the prime of life, and is more common in married
cular growths may be single or multiple, and may be a
sessile base. The color varies from a raspberry to a stra
as to size. Sometimes they are so exceedingly small as
of a pin, and are consequently overlooked. Others att
cherry. The usual site is at the lower angle of the meatu
the urethra for quite a distance, and so may remain un
has seen the whole rim of the meatus studded with the
attachment is at the mucous membrane, and that the
pedunculated. He further says, these growths are very fr
at their middle period of life, with the vascular degenerat
and from a number of observations which that author ha
concludes that they have much the same origin. The c
these growths, he remarks, are the abundance of loops of
and having very thin walls, with a singular deficiency
stroma. He had also seen nerve fibres in them. These
the features of these growths, and it is quite possible th
same way as is the vascular degeneration and atrophy of
rence is not the recurrence of malignancy, but rather th
neighboring district. This last statement, it will be obs
with the conclusions of M. Gosselin. Tait had seen no i
growths ultimately cease to recur, for almost the last c
before he wrote out his investigations, was one in which,
years, they had been removed at intervals of every four
the same author observes, the fact that they never reach
the view he had advanced, that they are really dilated c
surrounding tissues. Tait, speaking of the peculiar dege
to which the nymphæ are subject when associated with
instance he was enabled to remove a fragment of mucous
of this vascular change, and he found enough to display
rious disease. He placed the fresh fragment in a freezing
the section with hæmatoxylin, silver lactate, gold perchl
that at the site of the spot all the texture had been
walls of the capillaries and the superficial epithelium u
capillaries with thinned and dilated wall lays, almost
tions, he further says, explain the three chief clinical fa
the great pain, the abnormal vascularity of the spots and

* Lawson Tait, F.R.C.S., op. ci

touched, and the contraction of the surface as the third stage. It is, in fact, a progressive atrophy of the mucous membrane, the last texture affected being the blood vessels and nerves, for when the process has been completed, the pain ceases, redness disappears, and nothing remains but a vestibulum vaginæ so narrow that incredulity may be excused when the patient states that she has borne children. Tait had the good fortune in two cases to watch the complete course of the disease almost from the commencement to its perfect recovery, and had seen all the stages described. He bears testimony to the view that the degenerative process often works its own cure. Becoming interested in the researches of Tait and of others who have studied these growths with so much care, the subject seemed to me worthy of further investigation. I accordingly succeeded in obtaining the services of Dr. S. N. Nelson, of Boston, to assist me in prosecuting the work, and in illustrating the result of the following original investigations.

The caruncles of the female urethra on which these investigations have been made were about the size of a pea. Histologically they had the characteristics of papillomata, *i.e.*, connective tissue base growing outward more or less irregularly, with papillæ, and all covered with epithelium. When the surface is comparatively smooth the papillæ are of quite uniform size and length, forming pouches between them. When the surface is uneven the papillæ vary in size and length, and direction of growth. Typical arrangement of epithelium: columnar cells, oval nuclei in surface layers, *i.e.*, next to the surface of the papillæ. These are separately arranged—one or two layers; round cells with round nuclei in their middle portion irregularly disposed; large flat cells with large nuclei on outer surface, or squamous epithelium. In the pouches the same arrangement exists, and as they are always filled with the epithelium the flat cells predominate in the centre, which correspond to the outer surface. In any given section the majority of the papillæ are cut longitudinally, but owing to their irregularity certain ones with their intervening pouches may be cut transversely, and the pouches thus cut may frequently be seen surrounded on all sides by the connective tissue base. These will be recognized as such by being filled with epithelium, which has the same arrangement as the epithelium on the outside. These pouches should not be confounded with glands filled up, or with the lobules of a carcinoma. The connective tissue base is composed of connective tissue cells, and in addition always has more or less of the small, indifferent or wandering cells with small, round nuclei. These are generally irregularly disposed, and their number is dependent on the amount of irritation to which the individual caruncle is exposed, being few and scattered or very abundant. They are besides also found aggregated in certain localized spots of varying size. The vascularity of the caruncle is a varying factor, but the vessels were larger than the capillaries, abundant in no case, and in none were they as plentiful as in the submucosa of the normal mucous membrane of the urethra (see specimens and photos). The supply of nerves seems to be very questionable, contrary to the opinions heretofore advanced by J. Braxton Hicks, Lawson Tait, Read and others. Osmic acid failed to stain them, thus showing that there was no myeline present, and it is known that nerves near their terminations lose their myeline and tubular sheath, and the fibrillæ are composed of axis cylinder only. This was seen in the connective tissue base sometimes, but none of the terminal organs could be found, either as tactile corpuscles or Pacinian bodies. There is a question if the Pacinian bodies may not be found lower down in the tissues than the portion shown, which was excised to relieve the symptoms. The specimens examined were only those removed during such operations. Glands are not found in these growths, as in the normal mucous membrane of the urethra.

From the microscopic studies of the histology of these growths, urethral caruncles may be defined as neoplasms, new growths, papillomata, which do not tend toward retrograding, but remain as tumors, and this is true, although they have numerous points of contact, thus differing from ordinary inflammatory granulations.

The treatment of vascular growths must be adapted
some cases the application of ligatures has proved very eff
to excision, either by the knife or scissors, when followe
such as fuming nitric acid, has often resulted in effecting
sessile or quite flat we have to rely chiefly upon caustic
The galvano-cautery formerly was highly praised, but
thermo-cautery of Paquelin it is now seldom used.

Electricity or galvanism has been useful in the dis
applied, the object was not to effect their decomposition
An electric current was passed through them for a leng
size of the growth and the strength. According to Dr.
the zinc end of the battery, was the one applied to the g
was applied to some neighboring part. The operation s
until the growth was completely obliterated. Carbolic
saturated solution has been much used as a mummifyin
of chromic acid, applied by pressing it firmly on the s
is said, however, to cause some inconvenience and to
in a solution of carbonate of soda, to neutralize any exc
not now regarded as sufficiently potent to destroy the gro
of mercury and potassa fusa are often followed by painfu
of a red-hot needle, followed by a careful application o
cure. Painting the growth and the area surrounding its
cent. solution of cocaine has been done, and the operati
with curved scissors was painless. A five per cent. solu
the growth painless in five minutes. There was no pai
of excision. This case was reported by J. D. Eggleston,
1st, 1887.

The following cases are reported, illustrating the trea

CASE I.—Mrs. H., aged 42 years; of good physique an
years, without children. Was first seen by the writer A
dysuria and pain about the pelvis and loins. Patient ha
last five years. Noticed there was an occasional escape o
ition and also a discharge from the vulva. Considerable
in walking. Careful examination of the parts revealed
the size of a pea, at the meatus urinarius. The growth
flowed freely on the lightest touch. It was flat and
attached to the mucous membrane at the lower verge o
the part with a dilute solution of soda chlorinata the gro
portion of the mucous membrane on each side. Fumi
Subsequently, tannin and glycerine were frequently app
all unpleasant symptoms had disappeared, and the mea
nearly normal. Since that time the patient's family h
there has been no return of the disease.

CASE II.—Mrs. K., aged sixty years; mother of six c
and the only affection retarding her recovery was an atta
patient began, about five years ago, to have smarting and
a "dragging sensation" and other uncomfortable feelin
Later there was a slight discharge of blood after urina

* *British Medical Journal*, 1867.

† Clement Godson, *British Med. Jour.*, Jan., 1885; also "B
p. 257. ‡ See *Journal American Medical As*

more profuse. Patient became dejected and impressed with the thought that she was the subject of cancerous disease. Examination showed that the uterus was slightly retroverted, and that the vestibulum vaginæ was unusually narrowed, owing to the degenerative and atrophic changes of the mucous membrane. The capillaries in the vulva were dilated, and there were also several small patches of mucous membrane, quite red, and the redness only partially disappeared on pressure. Immediately in front of the meatus was a mass of veins and capillaries, quite flat and firmly held together by strong connective tissue. This mass was painless and of a deep bluish color. Just within the meatus was a flat or sessile excrescence, acutely sensitive, friable, and bled freely however lightly touched. As the patient had a weak heart and was a bad subject for ether, I began my treatment by applying fuming nitric acid to the painful growth, and the parts around were immediately sponged with tepid water. The applications of the acid were made at intervals of two to six weeks, covering a period of eighteen months, since which time nearly all unpleasant symptoms have disappeared. There is now no bleeding and the excrescence has also disappeared. The matted mass of veins and capillaries described as in front of the growth has not as yet very sensibly diminished, but is still painless, and no trouble of consequence is experienced from its presence.

CASE III.—Mrs. G., aged fifty years, mother of five children, began to suffer in May, 1880, from dysuria. She was frequently disturbed at night, and had a "bearing-down sensation of the bladder." She also complained of heat and burning in the vulva. There was a slight leucorrhœal discharge, and the urine was occasionally tinged with blood. She gradually became more restless and nervous, and by July, when I was first called, she was suffering extreme pain and other constitutional symptoms. Vaginal examination showed that the uterus and its appendages were in fair condition, but just within the meatus urinarius there was a vascular growth the size of a cherry, red and extremely sensitive, and raised above the mucous surface of the parts. The growth was partially pedunculated, and could be raised somewhat from the surrounding mucous membrane. The excrescence was friable and bled profusely when touched with forceps. The patient was etherized next day, and under antiseptic precautions the growth was removed by means of scissors. The mucous membrane on either side of the growth was also excised, and the parts freely cauterized by means of the galvano-cautery. Cicatrization was speedy and complete, and the patient considered herself not only relieved, but entirely cured. After a lapse, however, of five months, considerable sensitiveness began to return in the immediate vicinity of the former growth. Several enlarged papillæ appeared. These were removed, and their bases touched with strong nitric acid. This gave only slight relief, and she required enormous doses of morphia and other sedatives to overcome the nervous and sympathetic disturbance. The severe irritation now appeared to be chiefly centred in the nerve fibres and in the Pacinian bodies, in the vulva, and at or near the rim of the meatus. The patient's suffering from these little bodies at length became so augmented that whenever my visits were interrupted for a few days she sent for me in haste, informing me that she had found another growth, which gave her such uneasiness and suffering that she wished me to remove it. These different papillæ or sensitive points were removed with the point of scissors curved on the flat, and the parts were touched with crystals of carbolic acid liquefied by heat and strong nitric acid. The patient's suffering was so severe that her mind became unbalanced, and several months' treatment was required before she showed marked signs of improvement. Before recovery was complete the patient died of an intercurrent disease. The mucous membrane of the nymphæ and of the vestibule of the vagina had undergone gradual atrophy and degeneration.

I have also seen another case in which the mental condition was similar, and in which another surgeon had previously operated for urethral caruncle. This patient also

suffered a long time from sympathetic constitutional dist
progress toward recovery.

CASE IV.—Miss B., aged thirty-six years, and of ne
in delicate health for several years. Her menses appea
continued to appear quite regularly afterward. During t
began to suffer from pain in micturition and from uncom
region. She consulted a female physician, who attribute
placement, and put the patient on a course of treatme
patient gradually grew worse, and was unable to go u
exercise in the open air, owing to an impairment of th
latter symptom was regarded as resulting from a perverte
pain and other sympathetic symptoms grew worse and
Patient, though naturally possessing an amiable dis
betrayed symptoms of insanity. When I was called, in
less, emaciated and having been confined to her bed a
several months. When I first called the patient had sc
profuse hæmoptysis. She had râles, but there was no m
of hereditary predisposition to pulmonary disease. Pati
attack, and later vaginal examination showed that the ut
but not sufficiently to justify the opinion that it was a
ease. She complained of dysuria and extreme sensitiven
of the vulva were markedly sensitive, and pressure of
Microscopic examination of the urine revealed the prese
which undoubtedly came from the urethra. Exploratior
small speculum and by Ellinger's dilator, under anæsth
plasm, flat at the anterior aspect of the canal, but less sess
the mucous membrane it seemed about the size of a stra
growth and mucous membrane on either side were disse
oughly cauterized with Paquelin's instrument. Much
controlled by tampon in the vagina. Cicatrization follo
recovery was complete. No relapse has occurred and th

CASE V.—Mrs. D., aged thirty-seven years, and mar
a child two years after marriage; since then has not be
attendance, for the last four years, she had suffered m
often had spells of unconsciousness. She suffered very n
I was first called January 2d, 1886. At that time th
seizure of epilepsy. She was unconscious and the pupil
when I reached the house. Her husband informed me t
attacks, varying at intervals from one to three months;
treatment for her relief." There was foaming at the m
and the tongue was bitten early in the paroxysm. The
next day was quite well. Careful examination of the v
tive results, and no pathological factors as to the cause of
discovered, except that complained of as being connected
following, the patient had another epileptic attack, imme
examination of the meatus and urethra revealed the p
growth, situated just within the meatus urinarius. It
sensitive, and bled when touched with forceps. A 10 pe
ate of cocaine was applied, and the growth and mucous
dissected away with curved scissors, and the parts were
the thermo-cautery. The patient recovered wholly fron
and the dysuria ceased after the third week. The patie

but they were only *petit mal*, and for the last eight months has had no indications whatever of an epileptic attack. There has been no return of the dysuria, though there is some hyperæsthesia in the vicinity of the cicatrix when the parts are touched. The patient considers herself as cured.

I have notes of another case of *grand mal* occurring in a patient aged forty-seven years, who was cured after the removal of a urethral vascular growth.

Six months since I was called in consultation to see a case of a married lady, aged twenty-nine years, who had frequent attacks of *petit mal*, and who was relieved after the removal of the vascular neoplasm of the urethra. In the last case a four per cent. solution of cocaine and fuming nitric acid, applied at intervals of three weeks for three times, appeared quite sufficient to arrest the local disturbance and the epileptic paroxysms.

Urethral vascular growths are not always attended with local suffering in the parts invaded; for sometimes the manifestations of the augmented sensitiveness is experienced only at a distance from the part invaded.

I am in possession of notes of a case of vaginismus which I was called to see in consultation. All the exalted sensitiveness complained of was at or near the hymen, and at the entrance of the vagina. The woman, though married, was unable to fulfill her marital duties, and coition at length became impossible. Examination of the parts disclosed the existence of an exceedingly small and irregularly shaped urethral caruncle within the urethra. Three months after its removal the vaginismus disappeared altogether. Occasionally the local manifestations of a urethral vascular growth are only in the bladder, the uterus, or the tissues of the rectum. When the disturbance is centred in the rectum the cause of the trouble may be suspected at first to arise from fissure in ano; but the suffering occurring in the sphincter of the anus will not be as intense and constant as that which is experienced from a fissure of that part. Not long since a distinguished medical friend invited me to see a case of urethral vascular growth occurring in a married lady, who felt no inconvenience from the growth, except pain and dull aching in the hypogastric and lumbar regions. The patient was aged twenty-seven years, and was the mother of three children, but no cause for her suffering could be discovered except this growth, which was situated just beyond the meatus, in the urethra. It was sessile, extremely sensitive when touched. There was occasionally a slight admixture of blood with the urine, which finally led to the discovery of the growth. Thorough cauterization soon gave marked relief to the patient's distressing symptoms.

As a patient often gives a vague and indefinite description as to the seat of the affection, it is always necessary to make a careful examination, to insure the certainty of the existence of the growth.

I well remember hearing the late Dr. Charles H. Allen, of Cambridge, say that he had cured a woman of paralysis of both legs by treating her for a urethral polypus. Jonathan Hutchinson, as already stated, mentions, as occurring in his practice, a case of paraplegia resulting from a vascular growth at the meatus urinarius.

Recently I have used a saturated solution of cocaine, made solely by the use of strong nitric acid, with happy effect. This has enabled removal, even by scissors, if necessary, without other anæsthetic, and hemorrhage was easily controlled, no pain being complained of during, or subsequent to, operation. Of course, a general anæsthetic cannot be dispensed with in any but exceptional cases.

FIG. 1.

Caruncle of female urethra, 12 × . Outli
Papillæ and crypts. Foci of inflammat

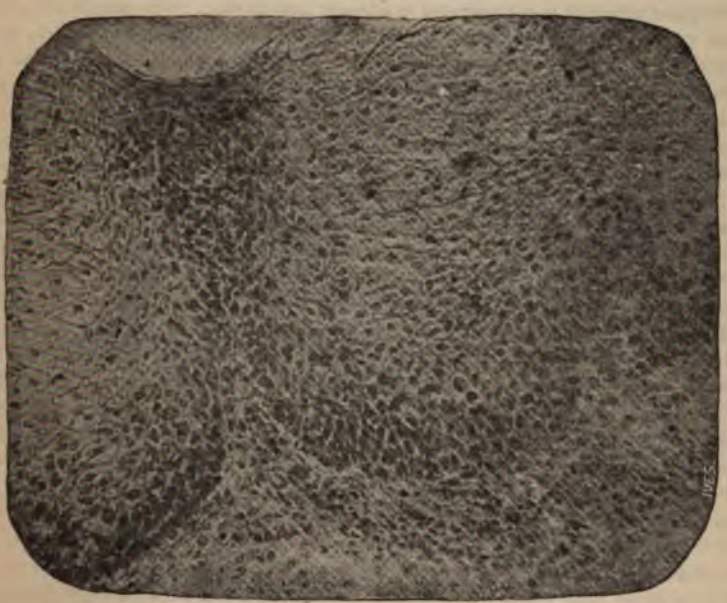
FIG. 2.

Caruncle of female urethra. 100 × . Outline of papillæ very

FIG. 3.

Caruncle of female urethra, 100 ×. Outline regular. Ditto papillæ and crypts. A portion of Fig. 1 more highly magnified.

FIG. 4.



Caruncle of female urethra, 500 ×. Two papillæ and crypts from Fig. 3 more highly magnified. Showing arrangement of epithelial cells on mucous surface, being from within outward: cylindrical, round and flat squamous cells.

Dr. ADDINELL HEWSON, Philadelphia, Pa., read a

## AN IMPORTANT POINT CONNECTED SURGERY.

### UN POINT IMPORTANT RELATIF À LA CHIR

### EIN WICHTIGER PUNKT IN DER ABDOMI

"Suppose I give a hint to you,
Suppose you give a point to la
Then I shall give a hint to yo
And you will give a point to n
Or, vice versa, or, very like it,
I'll give a point to all of you
And claim importance from it.

With these few words for introductory, some of w many of you, I will state that in my opinion nothing h gress of gynæcology than that which diminishes the ris operation which, by its earlier and more familiar name the excision of diseased ovaries, and was tabooed then as Further, I can state that it is not to the operation *per se*, ness and the dexterity with which it is performed, that ing cure, but that it is from the care and the accuracy fectly cleansed, closed and maintained so, to the comp sity of means to this end which the history of the op used successfully, indicates that we may yet find some secure such effects.

The point which it is my purpose to present here to- ing and maintaining the thorough coaptation of the wou liability to inflammation or irritation during the whole in this direction, there has been and always will be, a re results are best and most readily accomplished by tha there is most complete absence of foreign materials, as al of air. Thus, it has always been evident that the dim tures, stitches and hæmostatics, as also in the improveme ity, is of the greatest benefit, leading many to express th ment in this direction is still to be accomplished. Bu performed torsion of the pedicle and of all the bleeding something more than perfect hæmostasis is essential for a of abdominal sections.

My experiences have long made me trouble for the me ure, and I have now become convinced that the nearest of gauze, which was first proposed by the late Dr. Paul as a means of applying Maynard's collodion. The kind texture, known forty years ago by the name of Donna M curable by such a name. The warp of this tissue bein and its meshes greater in the length of the cloth than i power of resisting tension and destruction. This artic for ordinary dressings, costing me, for the last I could As I have stated, this tissue was proposed by Dr. Godd

* A song in Gilbert's "Ruddigo

the adhesive power of collodion. He early abandoned the pure collodion, on account of its liability to irritate, and provoke erysipelas in, the surface on which it is applied. The use, however, of gauzes of various kinds as the means for applying adhesive matters, was continued by Dr. Goddard to the end of his active professional life, and after giving to him all credit as the source by which I became familiar with the uses of tissues for dressing, and stating the fact that with him I had been compelled to cease using collodion, I will introduce here quotations from an article I read in March last, before the Philadelphia County Medical Society, which will help to show how I have been led to the use of the dressing which I am here to advocate: "I have constantly been searching for other (see paper read before the College of Physicians, October 4th, 1882) adhesive materials, such as glues, gelatines and the like, made flexible by a small quantity of glycerine. Then a fifty per cent. solution of liquid glass—that is, an aqueous solution of that strength of silicate of soda—and, still more recently, what was first named to me as 'bookbinders' paste.' This last-named article, in its pure and clean state, is simply a wheaten flour paste made in a porcelain crock by boiling thoroughly one part of flour in three or four parts of cleanly filtered water, always for twenty minutes, stirring the mixture all that time with a clean, new, wooden or bone spatula, the former being preferable. Such paste should be applied by a thin strip of wood, directly to the bare, clean integumentary surface of one of the sides which are to be secured together, and then one end of this strip of gauze is to be laid on it and rubbed gently and smoothly, so that the paste will come through the meshes. It should be applied no nearer the edge than the collodion would be, *i. e.*, not within half an inch of it. It dries as quickly as the latter, and has, indeed, the advantage of always drying even on a moist or dampened surface, a property wanting in the liquid glass, as well as the glue, even where expedients have been previously used to dry the parts. When the end of the strip first applied is fixed by the paste, some of the latter is to be put on the other side of the wound, and the gauze strip drawn across it and pressed on that side; the surgeon watching the contact of the lips as to how well it is secured, rectifying any irregularity to be seen through the meshes, by a probe. Sometimes, in a long wound, it may be advisable to secure the initial extremities of the gauze strips alternately on both sides. On other occasions it may be better to fix all on one side and draw them by their free extremities across, and so get equal amount of traction and tension in that way. The paste, when made strictly according to the directions I have given, and kept covered, in a dry place, will not sour as long as it be needed in one case, and such paste can be made the vehicle of various kinds of antiseptics and disinfectants." The best means I have found to keep pastes always sweet is the addition of a few drops of an essential oil, as sassafras or mint—the former being preferable, on account of its odor being less intense and less familiar in the sick room. These oils, so used in very small quantities, are capable, as is well known, of preventing the germination and development of various kinds of microbes, and so, in themselves, serve an important part.

Here are some samples of liquid glass—of "Flexible Gelatin"—in convenient form of sticks, which were prepared some years ago and have been preserved most satisfactorily by the essential oil originally used in their preparation; for you can see by the fly marks on the box that it has been among positive risks of contamination.

Here are also samples of various textures that I have tried with success for securing, without stitches, this closing of wounds in different localities. You will see their nature on the wall, where they are shown slightly magnified by the magic lantern. Some of these samples are illustrations of the strength of the textures, some of the power of the paste, and others of the tissues as made fast to each other, and of the weight per square inch which each tissue is capable of bearing without tearing or breaking.

The specimens in these boxes are those which I prese in Philadelphia, six months ago, and they have not been this late date their original strength cannot be fairly tes shown can, however, be fairly used. Thus the power of tan and of mosquito netting, the latter having one hund were shown to be capable of sustaining four pounds, extent of surface—I mean on one square inch of surf evident, say we have a complete cut, close to the linea n and to diffuse the support given by the gauze we will m plete, five inches wide; that is, it will cover (five by f of surface, which will give it, when perfectly secure, pressure of one hundred pounds diffused under that sur power in this dressing which will never in any case be t

Some have objected that profuse sweating of the surf all of it and so speedily destroy its usefulness. Such d my experience. Dressings put exterior or on top of the tion; wet applications are, however, never, in my opinio I am speaking solely in reference to dry dressings, and anticipate objections with any but dry dressings, to insist that, even with dry exterior applications, the mo bed, even her diaphragmatic breathing and the differen day, must quickly detach it, or diminish its support, but here is an illustration which will demonstrate the fears. I have here one of the two-gallon gas bags belong Its inside contour resembles that of the abdominal cavity showing where tension bears most and is least resisted i bag nearest to its nozzle may be readily recognized fo below the umbilicus, and the extra thickness evident by jug, may be taken to indicate the pelvic portion of the side indicates the location of the pubes, and on the oth sacrum. On the pubic side I drew a red line from it inches, to represent the line of incision in a major secti through which such incision would pass, in this bag, re the abdominal wall, outside of the recti muscles, for the of three different layers, one oblique downward, one upward; the two oblique sets crossing each other at rig in the abdominal walls. Thus the power of resistanc position best for its action. This red line, if it was a walls of the abdomen, would there give us, as the result, imitate this collapsing, I emptied the bag completely keep it empty. This empty bag was in precisely the ately after the ovariotomy is complete. I then applied t six inches long by one and a half inches wide, startin provision at that point for the pocketing or any other ma the pedicle, and I applied an additional strip at the u an inch wide, to represent whatever might be needed f strips, according to the calculation I have given of their by six inches, *i. e.*, thirty-six square inches of surface, inches receiving from the dressing a power of four poun portion of the abdomen covered by a single layer or thic and paste an external support to the wound equal to fou six, that is, one hundred and forty-four pounds—enough

source of resistance from within. I might add the support to be derived from vertical and oblique layers, but it is not required. After this single layer of mosquito netting was secured on the surface, by liquid glass, ready for testing, I filled the bag with all the gas the utmost pressure would drive in it. This bag now showed the accuracy of statement of its manufacturers (Richard Levick & Sons), to the effect that when so distended no further force from within could expand it more. Here I looked in vain for detaching or casting off of the gauze, which stretched, of course, for it was applied when there was absolutely no pressure upon it from within. Neither paste nor tissue yielded to the violent distention, and when the gas was removed, the layer was found as perfect as when placed upon it. This experiment with this bag was made on the 21st of August just past—more than fifteen days ago—and since then it has been in daily use in my office, and at the houses of my patients, taken to and fro in my carriage, where violent joltings have frequently thrown it about with much force. The experiment of distending and emptying it has been repeated more than twenty times.

A satisfactory point demonstrated by these repetitions is that the part of the bag on which the gauze and paste were applied never yielded to the distention as that part above the dressing, or that on its opposite side, which I call the dorsal portion, showing that we have had powerful force from the dressing to resist the pressure from within on that part where it still remains.

Mr. Gardiner, of Messrs. Levicks' Rubber establishment, has given me some facts in relation to the power of resistance in this material, which sustain my calculations on the power and support of this combined dressing.

Here I have a gas holder of a different character, belonging to one of the many forms introduced during the first excitement attending the gas treatment of consumption. It is made of pure gum texture, very thin and yet very distensible, yielding a good deal beyond its original capacity, by repeated distention, and capable of being ruptured from within, that is, by over-distention. It has indeed been ruptured, and quickly collapsed. But by stopping the distending force immediately, I saved it from tearing beyond a small angular opening of one-eighth of an inch each way. This occurred some time ago, and the rent was repaired very effectually, as you all may see. I have been using it constantly ever since, with other bags that I employ in my practice for the purpose of applying sulphureted hydrogen and carbonic acid gases directly to open cancers, tumors, open wounds and ulcers of all kinds, of which practice I hope to speak at length on some future occasion. This patch, for the first two or three weeks after it was put on, showed a power to resist the distention from within more than its surrounding parts, giving the appearance of a depression. I have applied on the other side of the bag, its abdominal side, the four strips of mosquito netting, as I did on the other bag, and with the same solution of silicate of soda, leaving in this instance the application of the solution off the surface for the extent of one inch on both sides of the lines of the external incision, as I always do, in order to see the position of its edges, being then better able, should they need it, to adjust them by a probe through these uncovered meshes of the netting.

I may say that in completing a laparotomy for a tumor or hernia, I always resort to the expedient of splitting the edge, to get a better coaptation of the peritoneal side than we can otherwise effect. By the time this adjusting is completed with the probe all the external edge will have become fastened by the serum of the blood which exudes under such circumstances. When this latter condition has come about, I paint the paste on the line and all around it, having all the wound completely and securely closed without the use of suture, stitch, wire or thread of any kind.

To prove that these assertions are correct in every detail, I will proceed with further distention of the bag.

Gentlemen: I thank you for your patience, and hope you are willing to admit that there is importance in the matter which I have given you.

Dr. Bernard Burns, Allegheny City, Pa., read the history of a case of—

## UTERUS BILOCULARIS.

### UTÉRUS BILOCULAIRE

### UTERUS BILOCULARIS.

I have the honor of presenting to your notice the history of one of those happily rare anomalies known and described as uterus bilocularis, or double uterus and vagina, occasioned by arrest or suspension of development of the conjoined ducts of Müller. Associated with this failure of normal development, it is customary to find other malformations, such as absence of the anterior abdominal wall, ectopia of the urinary bladder, absence of the symphysis, and cloaca formations. Our case is doubly peculiar in so far as it does not possess any of these complications, and while having a very interesting clinical history, is presented simply as a contribution to the statistics of double uterus and vaginæ.

M. T., aged twenty-five, married five years; no children, but one miscarriage two years since. Came to me complaining of bi-ovarian and uterine pains, sacralgia, profuse nabothian and vaginal leucorrhœa, intercurrent dysmenorrhœa, irritability of the bladder, external hæmorrhoids and fissure of the anus. She was hysterical, a nymphomaniac, and of rheumatic diathesis. Physical examination revealed the following peculiarities: Extending from the ostium vagina, in the median line, up to the point of insertion of the uterus proper, was a septum, attached to the base of the bladder in front and the rectum behind, merging into the interspace, between two perfectly-formed cervices. A sound introduced into the left uterus deflected toward the corresponding side and gave a depth of one and five-eighths inches. Depth of right uterus, one and three-eighths inches, deflected toward the right side. Bimanual examination under ether corroborated these measurements. The fundi were rudimentary, the cervices virginal, the external genitalia fully developed.

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Dr. Samuel Newell Nelson, of Boston, Mass., read a paper on—

## THE RELATION OF MICROÖRGANISMS TO UTERINE MYOMATA.

### (ILLUSTRATED BY PHOTOMICROGRAPHS.)

### LE RAPPORT DES MICROORGANISMES AUX MYOMES UTÉRINS.

### DIE BEZIEHUNG DER MICROORGANISMEN ZU UTERUSMYOMEN.

At the suggestion of Dr. Henry O. Marcy, who had somewhere seen a mere reference to the association of microbes with uterine myomata, as found in a single instance, I was induced to make the following experiment.

In June, 1887, multiple myomata had been removed from Mrs. A., by laparotomy. Two of them were subperitoneal, each being the size of the fist; and besides these there were numerous others, varying from the size of a hickory nut to that of a pea, both subperitoneal and in the uterine tissue, which was greatly thinned and quite changed. As soon as possible after the operation was completed, before the tumors had cooled, and while they retained the natural heat of the body, inoculations of culture tubes, containing sterilized agar-agar, were made, in the following manner:—

A large knife was sterilized by heating to redness, thus destroying anything viable on the blade. A deep incision was then made into the largest tumor, as soon as the knife had cooled, cutting the tumor nearly in two. The cut surfaces were moist, and a sufficient amount of fluid to be appreciable, perhaps half a drop, accumulated in the furrow at the bottom of the cut. A platinum needle sterilized by heating to redness was, after cooling, moistened in the fluid, and with the usual precaution the culture tube was inoculated by drawing this needle across the surface of the agar-agar, thus forming a single line of inoculation, seen as a depression on the surface.

In a similar manner other culture tubes were inoculated, and they were then placed in the incubator, whose thermometer constantly registered 98.5° F. (37.0° C.). On examination, twenty-four hours later, these culture tubes presented quite a different appearance, there being a distinct growth in place of the depressed line of inoculation. This growth was elevated above the agar-agar, had a smooth, glistening surface and edges, and was of a milky white color. A minute fragment of this growth was removed by means of a sterilized platinum needle, prepared on a microscopic slide, and stained with fuchsin for examination, for which was used a Leitz one-sixteenth of an inch oil immersion objective, aided by an Abbé condenser, with an ocular giving in combination an amplification of about one thousand diameters. Thus examined the growth was seen to be a pure culture of a bacillus which was morphologically similar to the hay bacillus or the anthrax (Miltzbrand, Charbon,) bacillus. Each element or rod being about half the size of an anthrax rod. Many threads were seen composed of rods placed end to end, and in addition to this arrangement bundles of rods placed side by side were numerous. This latter arrangement was probably accidental.

Examination two days later, or seventy-two hours after inoculation, showed a further change in the culture tubes. The growth had enlarged somewhat in circumference, the extreme edges being of the same milky-white color and glistening appearance as at first; but the oldest portion, or the centre of the growth, had become yellowish and the surface dull and wrinkled. Microscopical examination of this portion of the growth showed an almost entire absence of rods, but in their stead were found round bodies, about half the diameter of the rods, which took the stain less readily than the original rods, when only twenty-four hours old. In other words, these round bodies were spores, the protoplasm and the cell wall of the original rods having entirely disappeared, as was subsequently proved when watching their growth more closely.

A second generation was obtained by inoculating other culture tubes from the older portion of the growth containing spores, and this bred true. From the second generation a third was procured in a similar manner, and so on, until I now show you culture tubes containing the sixth generation, which is identical with the first culture. (Tubes exhibited here.)

These succeeding generations were cultivated in the incubator, whose temperature was constant, the thermometer registering 98.5° F. (37° C.) Attempts to cultivate the bacilli on agar-agar at the temperature of the ordinary living room, (70° F. or 27.22° C.) met with poor success, resulting either in a total failure of growth or in a small and much retarded growth, which could be obtained only by the use of a very large amount of inoculating material as seed, whereas, a scarcely perceptible amount sufficed for inoculation if the culture tube was kept in the incubator. This difficulty of cultivation at ordinary temperatures made unsatisfactory the attempts to cultivate the bacilli in gelatine, which, of course, would melt in the incubator.

When cultures were examined microscopically, before the growth was so old that the spores had become freed from the cell envelope, these spores were seen in the unstained specimens as round, shining, highly refractive bodies, occupying the centre of the rods, each spore having a diameter of about half the length of the rod, and this being

greater than the breadth of a rod before the formation of the spore; the rods which contain spores have a somewhat oval shape.

Another peculiarity which these bacilli exhibit is, that the spores as compared with the remaining protoplasm of the rod are much more easily stained than the anthrax spores as compared with the remaining protoplasm of the anthrax rod, the difference being most marked when Bismark brown (Vesuvin) is used for staining, and being least marked, often requiring very rapid work for any differentiation at all, when fuchsin is used.

The life history, then, of these bacilli is as follows: In a simple rod bacillus a spore forms, which latter is set free, the cell body and cell envelope disappearing. When this spore reaches a suitable medium under proper conditions of temperature, moisture, oxygen, etc., it grows, forming a new rod, which multiplies by subdivision, one forming two, two forming four, four forming eight, and so on, all remaining joined end to end, producing a long thread until accidentally or otherwise broken up. When these rods have attained the proper age, a single spore forms in each, which in due time is set free and the process is repeated.

In conclusion: In this one instance, a bacillus has been obtained from the interior of a large uterine myoma, and the question arises, What is its relation? As "one swallow does not make a summer," we cannot now assert that the relation of this bacillus is causative. To prove this relation, much more investigation remains to be made, and only after repeated results of a similar character can we be positive that uterine myomata are caused by microörganisms. At the present time, however, this is no more difficult to believe than formerly it was to believe that microörganisms were the cause of many diseases in which their causative relations have since been repeatedly shown, and in this very category, perhaps, tuberculosis is the most familiar illustration.

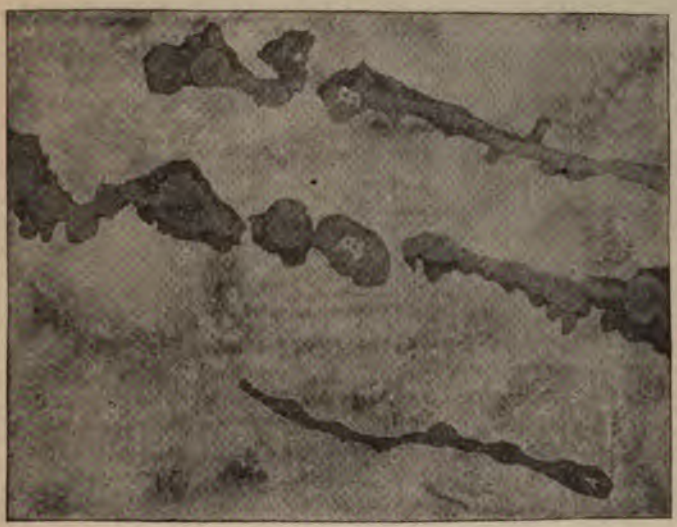
That a definite cause, acting under suitable conditions, always produces a certain class of symptoms, which indicate to us a certain disease, must be apparent; and that this cause is definite and unmistakable, capable of reproduction, and forsooth a microörganism, has been proven in relation to the acute infectious diseases, tuberculosis, anthrax, syphilis, etc. Why, then, is it unreasonable to suppose that cancer itself, and even uterine myomata, are also caused by microörganisms? That their cause is definite, being one and the same in different individuals, is apparent from the histology of the myomata, which always present the same peculiarities, varying from each other only in details of their size, number and arrangement of their cells, their vascularity, etc., as has been explained in full, in his exhaustive article, by Dr. Marcy, our president.

To Dr. M. G. Parker, of Lowell, I am indebted for assistance in making my microphotographs, which I will now project upon the screen.

Fig. 1 shows the appearance of the colonies growing on *agar-agar*.

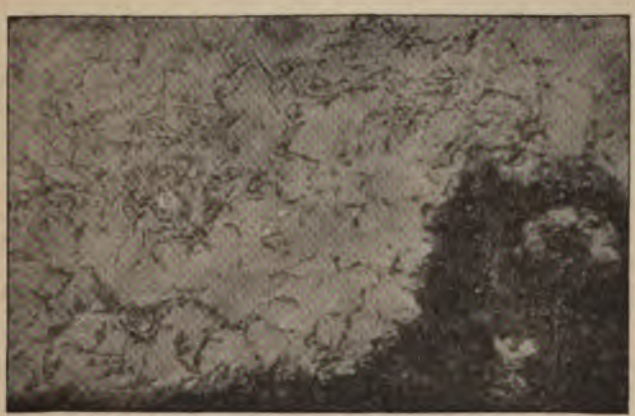
Fig. 2 shows the bacilli magnified about 2000 diameters.

FIG. 1.



A—Appearance of culture of bacilli from uterine myoma, on Agar-agar, 24 hours after inoculation. B—The same 48 hours after inoculation. Photograph enlarged two diameters.

FIG. 2.



Bacilli from uterine myoma. Photographed with a Leitz one-twelfth inch oil immersion lens. 2000 ×

Dr. E. H. TRENHOLME, Montreal, Canada, read a paper entitled—

## EXTIRPATION OF THE UTERUS FOR BLEEDING MYOMA.

### EXTIRPATION DE L'UTÉRUS À CAUSE DU MYOME SAIGNANT.

### DIE EXSTIRPATION DES UTERUS BEI BLUTENDEN MYOMEN.

The treatment of uterine bleeding myoma is one of much interest to every gynæcologist, and of late has occupied the minds of some of the best men in the profession. Much has been done in the way of progress, but we have still to face unsolved problems, and not a little uncertainty, when dealing with such cases upon the operating table. In very few cases is medical treatment of any service, and, as a rule, in interstitial myoma, nothing short of extirpation of the organ and tumor will avail to save our patient from an early grave. At any rate, it is my wish to speak only of severe cases where there can be no question raised as to the propriety of removing the uterus. I need not say that many of these desperate cases are permitted to die without interference, for the reason that the tumor is so situated that there is no neck available for the application of the clamp. The wonderful success of Dr. Keith, of Edinburg, perhaps the greatest master of this operation now living, has doubtless done much to make the clamp treatment of the pedicle the favorite method at the present time. Whether this is the best mode of dealing with the pedicle will be discussed further on. The use of the clamp, however, necessitates the presence of a sufficient amount of neck to enable it to be clamped above the vaginal attachment. When the fibroid is so situated as to obliterate the neck, or where one or more small fibroids occupy the lower neck, there is no possibility of applying the clamp. Now, it is in these cases that I wish to bring before you a method for forming a pedicle and thus securing all the advantages claimed for this clamp mode of operating. When the tumor is large I divide (A. Martin) the mass in two, lengthwise of the uterus, and then scoop out the fibroid. If there are two or more growths, one of which is low down in the neck, I still do the same with the larger growth, and then cut down upon and enucleate the smaller one. The superfluous expanded uterine muscle is then cut away so as to form two long, narrow flaps, about one and a half or two inches wide, the divided edges are brought together with a running catgut suture and the pedicle is formed, to be dealt with as you please.

To prevent accumulation of fluid, the cavity is drained by a tube forced just through the os uteri. In this way perfect drainage is available without the possibility of the entrance of air; and irrigation can be carried on if such should prove necessary. If the cavity of the smaller tumor so requires, the end of the drainage tube can be inserted into it and used as a preventive to the tube slipping out, while a little bulb at the vaginal end will prevent it from passing upward into the wound cavity. The curve of the tube is maintained by gill thread or iron silk, and allows of its removal at pleasure, without any inconvenience or suffering.

The question of the value of the clamp presses itself upon our consideration. Is it better than the V incision, first taught by myself? I doubt if it is, and after trial of both methods, it seems to me the latter method is to be preferred. The V incision allows of the use of the drainage tube, if needed, while it exposes no appreciable amount of fresh surface in the peritoneal cavity. Perhaps it does not afford as strong a support to the roof of the pelvis, but does this to such a satisfactory extent as to leave nothing to be desired upon that score. It, moreover, is a more neat operation, does not interfere with the primary union of the abdominal incision, and does away with the troublesome and disgusting sore left by the clamp. For these and other reasons, while able, *under all conditions*, to secure a pedicle and the use of the clamp, yet, the V method of operat-

ing seems to me the more preferable method. The clamp necessitates the separation of the ovaries and tubes before it can be applied, while by the V incision these organs need not be disturbed, the flaps of the muscle having the broad ligaments are brought into close contact and any possible hemorrhage prevented by what I have termed the quilting suture process. So much for the treatment of the pedicle, and just a few words about the abdominal toilet.

There is nothing like good-sized silver wire for securing a perfect and *steady* coaptation of the abdominal wound. These sutures, with the superficial horse-hair suture, are perfectly able to maintain the parts in apposition under all possible after conditions. Plaster bandages are a great inconvenience, interfere with the use of hot fomentations when required, never can do good and often do harm, and cause much suffering.

There are many points on which I differ from the majority of operators, but inasmuch as I dwelt upon the subject in a paper read before the Dominion Medical Association at Quebec, last year, I refrain from repeating them, but trust what has been said will lead to a discussion more fruitful in results than anything I could possibly offer.

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Dr. HENRY O. MARCY, Boston, Mass, read a paper on—

## THE HISTOLOGY AND SURGICAL TREATMENT OF UTERINE MYOMA.

### L'HISTOLOGIE ET TRAITEMENT CHIRURGICAL DU MYOME UTERIN.

### DIE HISTOLOGIE UND CHIRURGISCHE BEHANDLUNG DER UTERUSMYOME.

**Illustrated by Photo-Micrographs.***

Five years ago, in the address which I gave before the American Medical Association, as Chairman of the Section of Obstetrics, I incorporated the results of my studies upon uterine myoma, including the exhibition upon the screen of a series of histological preparations. To the present, no problem in surgery has been of greater interest to me, and for the better solution of which I have sought to avail myself of every opportunity. It is with intense satisfaction that I note the progress made in the intervening period. The interesting questions of proper wound treatment, which were then at white heat of discussion, may be considered to be in large degree settled. The rôle of the active ferments in wound infection is now subject to clear definition, and the differences of opinion held by the masters in the opposing lines of debate, like the agriculturists, have settled chiefly into the discussion of the adaptability of soil for the different varieties of fructifying seed. Now our distinguished friend, Mr. Tait, after years of careful study of the soil factorage of the problem, has accepted as fact that proper attention to the same, renders in large share abortive the seed implantation.

We review, with a degree of satisfaction, the last fifteen years devoted to study and experimentation for the better elucidation of this fundamental, vital question of surgery. To the student just commencing its study, the fruitage appears simple and easy ;

* The illustrations in this Section were projected upon the screen by Dr. McIntosh, of Chicago, special objectives having been made by him for the occasion. They were unquestionably superior to any which I have hitherto used. H. O. M.

but none, except those intimately engaged in the work, can know the difficulties that hedged about its proper solution, or the intense interest and enthusiastic zeal developed in its study. The limitations of this paper are such that the field of the study of uterine myoma, interesting as it is, must be greatly narrowed. I propose, therefore, to call your attention to but two factors, either of which, properly elucidated, would greatly exceed the time at my disposal. The first, the histological development and factorage of the growth. I am able to place before you a portion only, selected as illustrative specimens from a large series of sections, the result of the years of study. It gives me great pleasure to acknowledge the assistance of my friend, Dr. S. N. Nelson, of Boston, whose pathological investigations are already well known, and I would call your attention to the singular beauty and delicacy of many of the preparations. We had hoped, at the outset, to throw some light upon the cause of the pathological development itself. Some time since, I accidentally saw, in a brief note in a medical journal, that a bacillus had been found in colonization in the centre of the individual growth, and it was offered as a solution of the hitherto unknown cause, that the proliferation of cell character round about this, as a nucleus, was an attempt of nature to fortify against further invasion. We exhibit photographs of the cultivation of a bacillus grown in agar-agar, made by our friend, Dr. M. G. Parker, of Lowell.*

We well know that a priori reasoning is often fallacious, but the clinical history of uterine myoma would seem to preclude a germ implantation as the cause of their growth.

Differential staining and examination of a number of specimens have failed to demonstrate bacterial colonization in *loco*.

We think in the illustrations we have clearly shown that the character of the growth, no matter whether rapid or slow in development, has its factorage in muscular bundles united by very delicate layers of connective tissue. It is now generally accepted that the connective tissue rarely, if ever, becomes a predominant or even prominent factor. The rapidity of growth would seem to depend upon the different centres of development. For convenience these have been called lobules. They may be single or multiple.

The vascularity of these growths is usually very limited, even when in a state of active proliferation. I have succeeded in the injection of but a single specimen. This was effected by the injection fluid being subjected to a continuous atmospheric pressure. On the other hand, as has been seen, there is generally found a series of enlarged, oftentimes ectasic vessels, surrounding the growth with a kind of venous plexus, from which it is apparent that the myoma derives most of its nourishment by absorption. In a few instances, I have been enabled to demonstrate vessels of some size in the growth itself, but this is decidedly exceptional. When vessels are found, they are very thin-walled, usually lined with a single layer of endothelial cells. I have never been at all sure of my ability to demonstrate nerve endings or filaments in the tumor, nor have I been able to trace into the centre of the growth minute vein or capillary, about which it was supposed by Billroth the cellular proliferation was set up at the point of departure. Variously modified, the general picture of a myoma is reproduced, whether the location is interstitial, subperitoneal, or sub-mucous. The condition, more than any other, upon which is dependent the rapid increase, is the multiplication of the centres of development.

The changes in the uterine tissue about the growth are of greater importance than those in the tumor itself. It is easy to understand that the constant and increasing pressure, circumferentially in every direction, would produce a continued and increasing tension upon the enclosing tissue. In this way, the muscular bundles of the uterus,

* See careful description of same in paper by Dr. Nelson, published in this volume.

as differentiated from the tumor itself, change in their structural relations. It is easy to see that they are drawn out into a parallel layering of fibrillæ, extending some distance about the growth. The cells themselves are changed in structure and present, to the naked eye, appearances which earlier were accepted as a connective tissue capsule. Here, as in the growth itself, connective tissue does not seem to be relatively increased. Under pressure of this character, while the direct arterial current of blood supply is not much lessened, the venous return current is greatly impeded, and the thin-walled veins become dilated and pouched in great variation. In some cases, it seems that a futile attempt had been made by cell proliferation to fortify against the invading mass. Pari passu, by the enlargement of the uterine tumor, the peritoneal investment develops without material change, much as takes place in the physiological growth of the organ in pregnancy, or the marvelous increase in size of a cystoma of the ovary.

The endometrium undergoes no material change, except when the growth presses upon or into the uterine cavity, in such a manner as to disturb the nutrition of the uterine mucosa, with its complex and delicate glandular apparatus. In the class of cases, where exhaustion, or even danger, arises from uterine hemorrhage, the changes in the vascular supply of the endometrium often produce distinct pathological conditions of it. Where the tumor has become distinctly intra-uterine, it is easy to understand how the ectasic vascular plexus, formed about the growth, would be a constant source of serous if not hemorrhagic exudation.

The processes of reproduction may go on normally in the uterus, deformed by a myomatous growth, and the uterus is brought into pathological relations therewith, only from the fact of the mechanical disability of the organ, arising from the tumor, in the fulfillment of its physiological function. Under the increased nutrition of pregnancy, notwithstanding its complication and mechanical factorage, the tumor usually develops much more rapidly. Involution after delivery, in the same manner, oftentimes causes diminution of the growth. If labor is conducted to a happy issue, which is the decided exception, the period of lactation, accompanied by quiescence of ovarian action, is another factor favorable to the diminution of the myoma. It was early recognized that a cessation of menstruation acted favorably in bringing to a standstill the development of these growths, and often was followed by a marked diminution of the tumor. It was a legitimate deduction from these premises, that an artificial arrest of menstruation producing, so to speak, a premature menopause, would act favorably toward the retardation of these growths. Under the able leadership of Battey, in America; Tait, in England and Hegar, in Germany, with their many followers, it may now be accepted, as a demonstrated fact, that the removal of the uterine appendages for the arrest of the growth of the tumor is in very many instances advisable. This operation effects a marked physiological change in the uterus itself, most noteworthy, perhaps, in the atrophy of the endometrium. There can also be no question but that the cutting off of the blood supply is important in securing this result. The danger in the removal of the uterine appendages, in the hands of competent operators, is now reduced to a such a low percentage, that a patient suffering from a small interstitial tumor of the fundus, while yet in the middle period of menstrual life, may wisely consider the advisability of operation. In the large class of patients suffering from uterine myoma, they are not usually seen by the physician until the growths are already well pronounced. There yet remains much diversity of opinion among operators, as to the advantage to be gained by the removal of the uterine appendages when the tumor has attained a considerable size. The operation is then much more difficult and the results far less satisfactory.

When does a uterine myoma render hysterectomy justifiable or to be advised? To this question it may be replied, first, when it can be clearly demonstrated that the condition of the patient jeopardizes life in a degree greater than the operation. Under this head

should be classed excessive menorrhagias not amenable to treatment, and which endanger life. Second, where the location of the growth impedes or renders difficult to a dangerous degree the function of other organs. Third, a somewhat large class, where, from weight and discomfort, together with exhaustion and suffering, life has become an intolerable burden. I am myself constrained to believe that the danger to life itself from each of these three classes of condition is very much greater than the profession in general is wont to accept. If judged by the rule that the sins of omission are alike with those of commission, most of us might plead guilty in refusing operative measures in many cases of either class. In illustration of the latter, I shall long remember a woman of wealth and position, who sought for years, at every hand, for relief, asking of me for operation only a few weeks prior to her sudden death from pressure, and where the autopsy revealed a myoma weighing over forty pounds, without attachment, except by a pedicle not much larger than the thumb.

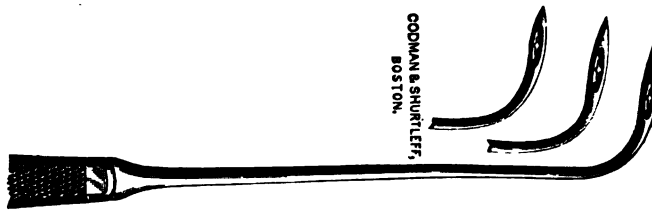
We are in a better condition to-day, to determine the dangers of hysterectomy and to predicate its advisability, than ever before The great gain and safety of modern wound treatment is perhaps better exemplified in abdominal surgery than elsewhere. The comparative immunity resulting from the removal of a cystoma of the ovary and of the uterine appendages has clearly taught that, with proper care, the abdominal cavity is within justifiable range of surgical research. It is doubtful if diagnosis can ever be carried to a refinement of differentiation sufficient to determine with accuracy the factorage and conditions of pathological changes within the abdominal cavity. Explorative investigation is the only key to open and render exact our knowledge of the same. That this should be resorted to much more commonly than is usually done is without question. With a patient of fair average vitality, the dangers of operative interference may be analyzed as shock, hemorrhage, and septic infection. Shock is a term, unfortunately, yet used to cover a series of unknown factors, but which may be considered the deleterious effect upon the nervous system. This I myself have, for a long time, believed to consist in a lessening of the temperature of the body, perhaps from interruption of the function of the nerve, heat-inhibitory centres. This may be only another term for the expression of a sudden lowering of vitality. In order the better to avoid this, I have for many years performed all severe operations in an atmosphere with the temperature at 80° F.

Some years since, for prolonged abdominal operations, I devised the use of a rubber coil large enough to cover the whole back, which is placed beneath the patient, through which, during the operation, water is kept constantly flowing at the temperature of about 110° F. I have felt that the danger of shock is thus reduced to a minimum.

Undoubtedly many lives have been and still continue to be lost from hemorrhage. The uterus, in its normal condition, is, in a very high degree vascular, and, as we have already seen, the vessels of the uterus are subject to very decided changes on account of myomatous growths. The arteries supplying the uterus can be ligated separately only with the greatest difficulty, and oozing from the divided uterine tissue can only be stopped by ligation in mass. This, as usually done, necessitates necrosis of tissue upon the constricting point, and is the chief objection to the intra-peritoneal treatment of the stump. For this reason, although, as a rule, the divided cervical tissues are less well adapted for external treatment than the pedicle of an ovarian cyst, the uterine stump is, almost without exception, treated by the extra-peritoneal method. The great advance in the last few years in ovariotomy, in its remarkable improvements in results, is justly attributed to the doing away of the clamp, returning the sewed-off pedicle and at once closing the abdominal wound, without drainage. It appears to me that every argument used in favor of the intra-peritoneal treatment of the pedicle in ovariotomy may be applied with still greater emphasis to the intra-peritoneal treatment of the stump in hysterectomy.

Assured of the avoidance of danger from hemorrhage and necrosis, with an aseptic condition of the parts, and you remove all the arguments used in favor of external treatment. This I think I have in large degree secured. I had the honor of advocating the method which I now describe at the International Medical Congress held in London, in 1881. With only slight modifications, I have continued its use until the present with increased satisfaction.

Over the exposed tumor which, if of considerable size, should be drawn up from its position (very conveniently by one or more corkscrews introduced into the tumor and used as handles), a sheet of pure rubber, through the centre of which is a reinforced opening as a ring, is forced down as far as possible to the cervix. About the reinforcement one or more turns of elastic ligature is made. The intestines are carefully protected, the abdominal wall being drawn together as securely as may be by a sublimated towel placed over the abdomen. The abdominal cavity thus protected, the remainder of the operation can be easily conducted under irrigation, a most important factor in prevention of wound infection, which alone would render the rubber apron of marked service. This use of the rubber was suggested to me from its service to the dentist about the root of a carious tooth. The elastic ligature renders the operation bloodless, except the venous engorgement of the tissues. It is distinctly preferable, profiting by the knowledge of the easy enucleation of the growth, to cut open and remove the tumor or tumors. In rare instances of single growths, the wound may be safely closed and




the uterus preserved intact. This can only happen when the tumor is subserous and attached by a pedicle, or where the interstitial growth has not so deformed the uterus, but that its cavity may remain intact after its removal, and the uterus be restored, in considerable degree, to its original shape. It was in the hope of saving the uterus after removal of the tumor that I began my histological investigations, now more than ten years ago. I was not then aware that myoma were so rarely single in their development. Dr. Martin, of Berlin, almost the only prominent operator that I know who practices the intra-peritoneal treatment of the pedicle, has had most remarkable successful results in the excision of uterine tumors with the preservation of the organ. Of sixteen cases of enucleation, thirteen recovered, the last ten consecutively.

When the large mass of the uterus and the tumor have been removed, an assistant holding the stump with forceps, the pedicle just above the constricting ring is sewed through and through by the use of a long needle set in a handle, without cutting point, with an eye near its distal end. I first used a modification of the so-called Peaslee needle, and adapted it to this method of suturing by the enlargement and elongation of the eye, nearly ten years since. I have experimented by variously changing the shape and curve of the needle, until I now prefer as the usual pattern a strong needle with a well marked curve. They are made in different sizes by Messrs Codman & Shurtleff, of Boston, and Tiemann & Co., of New York. Threaded with an antiseptically prepared tendinous ligature, commence near one side, and thrusting the needle through, detach the suture and re-thread the other end, then withdraw the needle, thus

making a shoemaker's or saddler's stitch, which carrie
opposite directions, through the same hole made by a sm
process is repeated, enclosing purposely only a comparat
sue, and uniform pressure is carefully continued until the
frequently using ten or more stitches, from one-quarter
Then one knot completes the fixation, reducing to the
from the animal ligature.

The amputation of the uterus is completed by a doul
are carefully approximated by a fine continuous animal s
which leaves the line of closure about an inch and a half
The constricting elastic ligature is now loosened, the ru
dropped into the abdominal cavity and the operation com
advantages of this method are: First, the abdominal ca
sible contact, and the *toilette de peritoneum* is entirely avo
the operation is almost bloodless and no hemorrhage ca
ondary. Bleeding from the stump is prevented by the
one continuous suture; this is rendered still more certai
tinuous sewing of the opposing parietal edges. Third
method we compress the tissue sufficiently to control he
duce necrosis of the distal portion. Equalized pressur
suturing, since one stitch cannot compress more than a
speedily ensues, shutting in the connective tissue fibre
either produces its absorption or causes it to be repla
Thus treated, we may believe drainage unnecessary, that
large measure, avoided, and thereby peritoneal inflamma

It is generally wise, the vagina having first been mad
of suturing, to cut away the endometrium of the cervix,
may pertain to this portion of the organ. If this is not
before the cutting, apply carefully to the cervical mucous
crystals of carbolic acid, or a 1 to 100 bi-chloride me
where, for any reason, effusions may be presumed to fo
duce a short drainage tube of rubber through the posterior
peritoneum of the abdominal wound is closed by a fine c
which the operation is finished under irrigation. The re
mation by a buried animal suture and the skin is careful
suture. The wound is then sealed with iodoform collodi
been used the vagina is lightly filled with iodoform wool.

An operation thus carefully conducted is rendered as s
tomy for any other cause. No matter how careful the
infection cannot be absolutely eliminated. But, by mea
and now fortunately in common use, with more or less n
operators, infection is reduced to the minimum.

The greatest danger lies, first of all, in the operat
cleanliness means asepsis I am content with the definitio
upon the condition of hand and sponge, the two gre
than does he. Acting upon the principle that the a
infection, I regard the preparation of the operating roo
floor and the wall, before each operation, are washed wit
and the room is subjected to carbolic spray an hour befor
The abdomen is carefully scrubbed with bichloride soap
dry clothing of the patient is protected by light rubber,
towels wrung out in a 1-1000 bi-chloride mercuric so

entirely covered, except a small portion about the surface to be operated upon. I have devised a large, inflated rubber receptacle, with an outlet for free outflow therefrom, which is placed beneath the patient to receive the irrigating and other fluids. The operator and his assistants exercise scrupulous care to be themselves free from infection. This includes the washing of the head and beard, as well as the hand and arm, in a strong bi-chloride mercuric solution. Instruments are taken from and when not in use immediately returned to a bath of 1–40 carbolic acid solution. Sponges are used as little as possible, and only those that have been for a considerable period soaked in a 1–1000 mercuri-bi-chloride solution. Challenge critical inspection of all ligatures and sutures. The most trustworthy and satisfactory which I have found is the long tendon from the tail of the Kangaroo. When ready for preparation, these should be lightly chromicized and then soaked for a few hours in a 1–1000 bi-chloride mercuric solution, mounted in assorted bundles upon glass rods, and kept in a tall jar of ten per cent. carbolic oil. They are thus ready for immediate use. It is wise to prepare a considerable quantity at a time, since the sutures are greatly improved by age.

In illustration of the danger which may result from imperfectly prepared sutures, in two of my recent cases of hysterectomy, in order to economize the rapidly diminishing supply of tendons, I used a new specimen of exceedingly handsome English catgut, the skeins of which were imported in carbolic oil. The use of this was limited to the deep suturing of the recti muscles, and was applied under irrigation. Both cases developed a pure microccocal culture along the line of the buried suture, resulting in multiple abscesses; the recovery of one was satisfactory, with this exception, while in the other death supervened the fourteenth day, following a phlebitis of the left leg.

An Alexander and one other operation, where buried suturing was used from the same supply of catgut, were also followed by abscesses, and made slow recovery.

Of importance, secondary only to the infection of the wounded surfaces, do we consider the treatment of the wound itself. By this we mean, using the metaphor, the care of the soil, as well as the seed. The wounded surfaces should be protected, as much as possible, from manipulative injury. Careful approximation of the peritoneal edges of the cervical pedicle leaves little room for infective absorption. The peritoneal cavity should be left as clean and dry as possible. If necessarily infected during the operation, it may be safely and thoroughly washed with a bi-chloride solution of 1–8000 or 10,000, at the temperature of about 100° F.

If fear of mercuric poisoning should be held by any, this may be followed with water that has been boiled and cooled to the proper degree. As far as practicable, leave the peritoneal cavity, as well as the approximated edges of the wound, not alone especially clean, but also dry. The ordinary septic ferments reproduce imperfectly, except in fluid. Tissues which have not been greatly lowered in vitality are usually able to protect themselves from germ infection.

The attention of the profession has been called, for a considerable period, to the effect of galvanism upon myomatous growths. The subject has been most ably discussed at this meeting of the Congress, and we have listened with intense interest to the views held by the masters. May the future results demonstrate the sanguine hopes of its most enthusiastic advocates.

It seems but yesterday that the surgeon who dared to advocate hysterectomy did so at the peril of his professional repute. To-day, it is established as a legitimate procedure with pretty clearly defined limit. The surgery of the present is being rapidly rewritten. Our age marks an era in its development. The comparative safe surgical removal of myomatous uterine growths is in a fair way for clear demonstration, and will be advised in a large number of cases usually hitherto considered beyond relief. We venture little in predicting that the next decade will add no less brilliant triumphs in gynecic as well as general surgery.

PLATE I, FIG. 1.*

*a a*, Double myoma. *b b*, Uterine tissue, much changed by la
capsular layers.

* A. Towles' one-inch objective used. Amplificatio

PLATE I, FIG. 2.

*a a a*, Three independent tumors. *b b b*, Series of extra
vessels. *c c c*, Connective tissue. The surroundin
sure and tension exerted by the growing masses,
or less parallel fibres, which might be mistaken f
diameters.

PLATE II, FIG. 1.

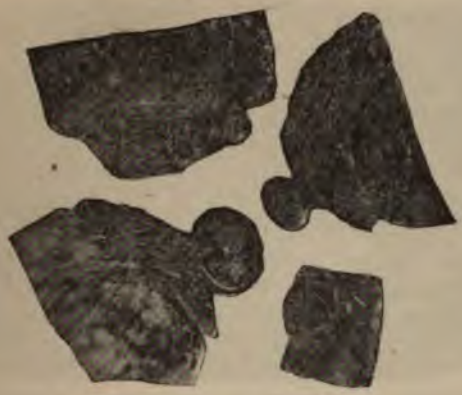


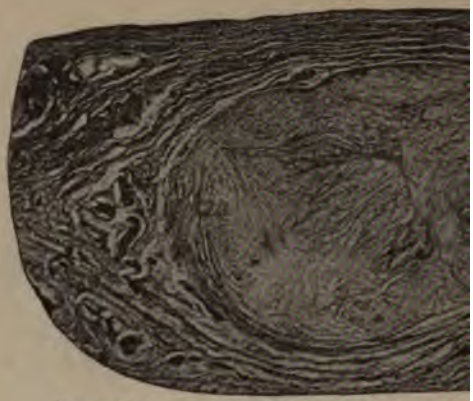
PLATE II, FIG. 2.

Figs. 1 and 2. *a a a*, Multiple myoma; ten diameters. Smaller growth, sub-peritoneal. *b b*, Deformed uterine wall.

PLATE II, FIG. 3.

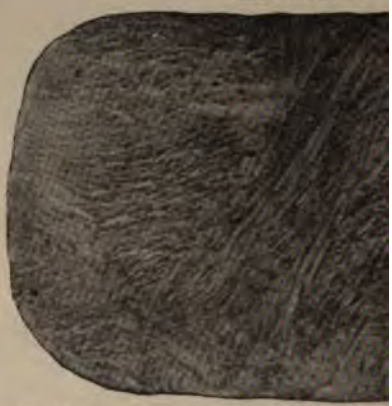
Section of a sub-peritoneal calcified myoma, which could only be divided by a saw. *a a a a*, Bundles of fibres cut in various directions. *b b b*, Limited areas infiltrated by lime salts.

PLATE III, FIG. 1.



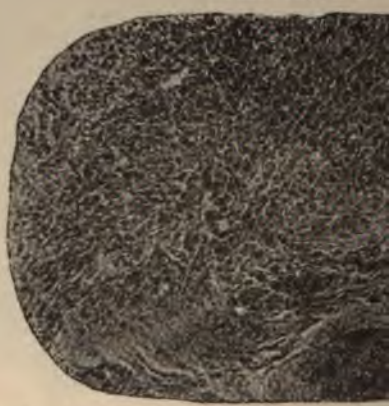
Interstitial myoma, injected under continuous press

PLATE III, FIG. 2.



Section of myoma. × 500 diameters. Muscu directions.

PLATE III, FIG. 3.



Section of myoma, 400 diameters. Towle's imm objective. Muscular bundles cut in various many of the cells are easily distinguished. nowhere in excess.

DISCUSSION.

r. A. DUNLAP, Springfield, Ohio, opening the discussion, stated that for many no subject had possessed for him a greater interest. He had made many experi- s in the treatment of the stump after hysterectomy, and had used a stitch some- ; like the one devised by Dr. Marcy. He had imitated the shoemaker by ding each end of a suture in a needle, and as nearly as possible thrusting them opposite directions through the same part, side by side; he tied each stitch thus , which he thought, perhaps, was an improvement upon Dr. Marcy's method. n he was informed of Dr. Marcy's operation, he had accepted it as better than wn, and had never published his studies upon the treatment of the uterine le. He fully accepted the intra-pelvic treatment of the stump, with closure of bdominal wound, as a marked advance in the surgical treatment of uterine ds where hysterectomy was deemed necessary.

r. C. R. REED, Middleport, Ohio, discussed the advantages of different methods e treatment of the pedicle. The extra-peritoneal one had alone the advantage e knowledge and control over hemorrhage. By the methods devised by Dr. y, it seemed the dangers from loss of blood during and after the operation were ced to a minimum, and that the return of the stump thus healed could be safely ed.

r. A. HEWSON, of Philadelphia, was under obligation to Drs. Trenholme and y for the able presentation of the surgical treatment of myoma. Dr. Marcy's ods for the arrest of hemorrhage were certainly to be commended for their ality and simplicity. They seemed to furnish the best and safest way to control langer which hitherto has been much the greater of all in the performing of rectomy. In his hands he has seen exceptional results from his dry-earth treat- , rendering, not seldom, surgical interference unnecessary.

r. E. H. TRENHOLME, Montreal, in closing the discussion of his paper said: is experience the removal of the ovaries for the arrest of the growth of nas had been uncertain, and in the main disappointing. It was not easy to do the tumor was of any considerable size, and the vascularity of the surrounding es was a subject of important consideration. The age of the patient was ever to pt in mind. When the menopause has already taken place, the condition was, urse, more hopeful; but even here the growths often continue to increase.

r. J. TABER JOHNSON, of Washington, expressed a deep interest in the subject r. Marcy's paper. The teachings of the paper, especially as shown by the large s of sections upon the changes in the surrounding vascular supply, is of the greatest rtance. The two great changes are hemorrhage and septicæmia. The methods ed by Dr. Marcy are of great value in the lessening of both. The dangers from rectomy were never to be considered as other than very great, and we must be con- tive in giving advice in matters of such gravity. In the light of the teachings sterday, let it be hoped that less severe measures will be commended, and we find ctrolysis a safe and well-advised means of cure.

r. F. W. ENTRIKIN, of Ohio, was opposed to resorting to so dangerous an opera- as hysterectomy for the relief of myoma, unless in a very small class of selected . He was encouraged by the remarkable successes in abdominal surgery, but dered caution necessary in all cases. Ergot with rest and constitutional treat- t had seemed to him to be much the best for a large class of cases.

Dr. WATSON, of Ohio, hoped the interest awak hysterectomy as Dr. Marcy, would not cause a too fre operation. When done, it should be attempted onl careful training. Although he had had a long ex fibroid tumors, the mortality was not great, and in l results in the use of ergot as commended by Dr. Ne

Dr. AUGUSTUS P. CLARKE, Cambridge, Mass.— able and interesting paper on "Histology and Myoma," I feel confident, from my own experience tion, that Dr. Marcy has demonstrated the certainty uterine myoma. This feature in the histology and be remembered, was beautifully shown upon the sc nourishing such growths in some cases may, at lengt take on a retrograde process, but there are cases in be taken without waiting for such an event. Ergo the pecuniary circumstances of the patient often de treatment. I have had the good fortune to witness, Dr. Marcy's cases of uterine fibroids, and in the gre any operation was undertaken by him the results w size and position of the growths often modify our pr ment, and though the smaller uterine tumors are of shall, nevertheless, find continual suture an im results of the operation. When the patient's life removal of the larger-sized tumors, even if deeply In cases of subperitoneal fibroids, when there is excision by laparotomy is frequently demanded. W from the uterus cannot safely be undertaken, extirp the method of Professor Martin, of Berlin, or ablati may be undertaken. The histology of these growth their character, and, as said before, when the patient increasing experience leads us to hope for more interference. We should be exceedingly wary how lished statistics relating to surgical operations and tr we are here discussing. For in all such cases exper upon the varying phase of each individual case, the and the accomplished skill of the operator, than on value and character of which it is possible for us to requiring surgical interference the strictest antisepti

Dr. E. E. MONTGOMERY, of Philadelphia, Pa., to the papers of Drs. Trenholme and Marcy. Ther operation is indicated as much by the circumstanc dition of the growth. Thus, in a sessile submuc elongated by the traction of the growth, it is true, enucleate and pedunculate the growth, but a w exertions for her sustenance could not afford the tim

The removal of the ovaries does not always bring and where the uterus can be readily removed, that

The plan suggested by Dr. Marcy, of controlling enables us to operate upon pelvic tumors that would

Dr. MARCY, in closing the debate, stated his obligations for the favorable criticisms which had been so freely made. In reply to Dr. Hitchcock, as to the objections to operation where a large myoma filled the pelvic cavity, and how best to meet them, he would say, that in his experience these were the ones which usually cause the greatest suffering and danger. They certainly were much more difficult to remove. There is in such cases no pedicle, and one must be made from the deformed uterine tissues. Here the rubber fenestrated apron is to be made to encompass the growth as far as possible, and then constricted by the rubber ligature. After this cut the uterus boldly open, removing by enuclation the growths, and then form from the tissues about the cervix a stump, as described in the paper. This is finished in such a way as to leave no open wound within the peritoneal cavity.

Dr. Marcy said, in reply to the question of Dr. Weeks, of Me., that the after results in his cases had been satisfactory. His first case was now nine years since. There is a small nodule at the roof of the vagina, made by the cervical stump. He was obliged to Dr. Dunlap for the statement of his interesting experience. He could not help thinking the stitch which he advocated was better than that tried by Dr. Dunlap, since it must be borne in mind that compression sufficient to secure control of hemorrhage was sought, and a ligation to effect necrosis was to be avoided. This was the better effected by his double continuous suture, since one stitch, in a measure, compensated for another by the equalizing of the pressure brought to bear upon the tissues. The ill effects of too tight ligature he had recently had exhibited to him in the inspection of a post-mortem specimen, where the operator, a distinguished surgeon of his own city, had ligated and removed a myoma attached to the fundus by a thin pedicle. This had been tied in halves by a double ligature, so tight that necrosis had supervened, and death followed from it. . . . He had never had the priority of the use of his method of suturing questioned, and yet, from its ease of application and simplicity, it seemed a wonder it had not become of general use in a number of operations. Dr. Marcy uses it in the sewing off of the pedicle in all ovariotomies, and in some of the deeply imbedded cysts of the broad ligament the removal can be safely effected, where usually the cyst has been removed only in part, and the sac stitched into the abdominal wound. He had removed a number of such cysts in this manner, and in no instance, either in hysterectomy or cystic tumors, had he ever had a hemorrhage, either primary or secondary. He did not feel safe with silk, since he felt that aseptic silk even causes irritation, and is often a source of trouble months after it has been buried in the tissues. Tendon is much to be preferred over catgut. The use of the elastic ligature is only a modification of Esmarch's use of rubber. Dr. Marcy, however, believes he was the first to advocate the use of the elastic ligature, now about nine years ago, for the constriction of a myoma at the base of the uterus, as a temporary means of controlling the blood supply, as well as the devising and use of the "rubber dam." This occurred to him after the encircling of a carious tooth with a thin piece of rubber by his dentist. The reinforcement of the opening through the sheet serves the double purpose of constriction and the prevention of the slipping of the elastic ligature. Of course, its chief advantage is the protection of the abdominal contents from injury and contamination, while, at the same time, it renders easy and safe irrigation during the operation, otherwise impossible.

He had, also, for the purpose of receiving the blood and irrigating fluids, devised a large, ovate, inflated rubber receptacle, with an outflow, which is placed under the patient. This prevents the soiling of the bedding or room, and allows the patient's clothing to remain dry, warm and clean.

Dr. Marcy closed with the prediction that many improvements were yet to be made in the surgical treatment of myoma, and, while it could never be looked upon as simple or safe an operation as ovariotomy, hysterectomy would be favored by many now opposing the operation, and be recognized as clearly advised in a considerable class of cases.

Dr. A. F. PATTEE, Boston, Mass. :—After listening to the able and scientific paper on the Treatment of Uterine Myoma, by Dr. Marcy, President of the Section, a paper full of careful research and observation, covering the whole domain of abdominal surgery, I am doubtful if I can add anything of interest or profit. From an experience of over a hundred cases, I must confess that I am still more in favor of giving medicine a thorough trial, in preference to the immediate use of the knife.

I will cite a case to show that, in my hands, at least, desperate cases do get well without the interference of surgical aid.

CASE I.—Mrs. ——, aged thirty-five (dressmaker), consulted me in 1872. She had her first child at the age of twenty-one—no miscarriages. Her menstrual flow had been profuse for a number of years. The abdomen was as large as it would be at full term, and she was pronounced pregnant by a very respectable surgeon. The enlargement commenced about one year after the birth of the child, increasing gradually. She had suffered severe and almost constant pain, which she described as of a "bearing-down, tearing and rending" nature. Occasionally she would have sudden attacks of gastralgia, when relief could only be obtained by the hypodermatic use of morphine and atropine. Sometimes the menses would be absent for several months.

She was told by another prominent surgeon that her case was hopeless unless she underwent a surgical operation, which of itself was not wholly devoid of danger. She declined having the operation, and I saw her soon after. Upon making a digital examination—the patient standing—I found the os dilated to about the size of a twenty-five cent piece. Placing her upon the table, I passed my hand up the vagina, and introduced my finger into the uterus. I could feel numerous hard, round bodies, ranging in size from a pea to a hen's egg.

I dilated the uterus with my finger until I could introduce my hand, and separated some of the largest growths. Profuse hemorrhage followed. I gave ergot, and continued my exertions in dislodging the mass, and in about six hours was rewarded by completely removing the whole collection, which consisted of about a hundred large and small spherical bodies, almost white, and very hard and tough, and held together by unstriped muscular fibres and connective tissue. No calcareous formation was present. The whole mass weighed ten pounds. Some hemorrhage followed, which was controlled by ergot.

The patient made a good recovery, and is still alive and in excellent health.

CASE II.—Mrs. ——, aged twenty-eight. Child two and a half years old. First consulted me in 1874. She had a small uterine myoma that projected into the left iliac region. The tumor was quite painful, and she was in a general hysterical condition, full of morbid fears and fancies.

She had been examined two days previously, by two skillful surgeons of Parisian finish, who recommended a surgical operation, as without one death was imminent, and continual suffering during the short time she could live.

This is the patient's story. She declined having any operation.

I gave her the following treatment: Ten drops fluid extract caulophyllum before meals, in a wineglass of water. Fluid extract ergot, one drachm two hours after each meal, in wineglass of water. And for two months a current from forty Siemens-Halske elements was applied. The positive pole by means of a large surface elec-

trode, and the negative by the intra-uterine electrode, for fifteen minutes, every third day.

The patient improved very fast under this treatment, and in eight weeks the induration had completely disappeared, and for the last ten years she has been well; no tumor can be felt by the most careful examination.

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# CONTRIBUTIONS TO THE MORBID ANATOMY OF CHRONIC INFLAMMATION OF THE MUCOUS MEMBRANE OF THE UTERUS (ENDOMETRITIS CORPORIS CHRON.).

## CONTRIBUTIONS À L'ANATOMIE PATHOLOGIQUE DE L'INFLAMMATION CHRONIQUE DE L'ÉPITHÉLIUM UTERIN. (ENDOMETRITIS CORPORIS CHRON.)

## BEITRÄGE ZUR PATHOLOGISCHEN ANATOMIE DER CHRONISCHEN ENTZÜNDUNG DER UTERINSCHLEIMHAUT. (ENDOMETRITIS CORPORIS CHRON.)

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### I. THE INTERGLANDULAR TISSUE.

During the last half score of years, since investigators have begun to take a more lively interest in the pathological anatomy of Chronic Endometritis, they have especially endeavored to draw up different forms of this disease. They formerly distinguished between a glandular, an interstitial, a mixed, and a vascular form; but it very soon became apparent that it was only possible in very few cases to classify the disease under one or other of these forms; nay, we often found in the mucous membrane of the self-same patient some parts that must belong to one of these forms, and others that belonged to another. In these investigations the inquirers chiefly took heed of the relations of glands, blood vessels, and lymphatics, while but slight attention was bestowed on the more intricate construction of the interglandular tissue. Some, especially Wyder,[1] denied that decidua cells could be found in the mucous membrane of the uterus, except during pregnancy; others, chiefly C. Ruge,[2] assert that we can find them during the course of an endometritis, especially that endometritis which accompanies myomata uteri. Schröder[3] lays down a form of endometritis (E. dysmenorrhoica) distinguished by peculiar symptoms, where there are strong bands of fibrillous connective tissue in the interglandular tissue. But, generally, the interglandular tissue is dismissed with such remarks as, that it, as usual, consisted of closely-packed cells with small, round, or spindle-shaped nuclei, that almost filled up the cell, — or some such expressions. Heinricius[4] alone gives the following description, accompanied by a drawing, of the construction of the interglandular tissue in the chronic hyperplastic endometritis (E. fungosa): the stroma consists of a net of meshes formed by cells, with thin, star-shaped processes communicating with each other. The nuclei of these cells

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[1] *Arch. f. Gyn.*, Bd. II., pp. 1-55.

[2] *Ctrbl. f. Gyn.*, 1881, No. 12.

[3] *Zeitschr. f. Geburtsh. u. Gynækol.*, Bd. x., p. 441.

[4] *Arch. f. Gyn.*, Bd. 28, p. 203.

are irregular or triangular 5–12 micromillimetres ($\mu$) lo there are two species of nuclei: large, oval, slightly sta nucleolus, 7–15 $\mu$ long, 5–10 $\mu$ broad, and small, highl shaped, the oval ones' diameter being 3.7–6 $\mu$, that c 3–4 $\mu$ broad.

The investigations, the results of which are given i me on parts of the uterine mucous membrane, scraped and then laid as quickly as possible in absolute alcoho celloidin, the sections stained with hæmatoxylin, wit lithion-picro-carmine, and Bismarck brown, and they glycerine or Canada-balsam-xylol. The patients on wl membrane were performed suffered from severe metro patient only was there a chronic catarrh, with consid rhage.

The interglandular tissue is generally seen formed the basal substance properly so-called, the stroma, is sections. When the stroma is distinctly visible, it app with an irregular, delicate delineation, perhaps produ But *I never saw anything resembling that described by He* by star-formed cells with thin processes that anas seems evident from Heinricius' description, that it meshes is not a morbid inflammatory product, but uterine mucous membrane. But neither here have responding to this reticular tissue. Of course, it is *normal* uterine mucous membrane for investigation th had two normal specimens at my disposal, both of wl hours after death. The one patient had given birth to half year ago, and was still suckling. She died very patient, a girl fifteen years old, died of acute miliary period. The specimen from this patient was first trea with alcohol; the other specimen was immediately sections were stained and examined as above described ful examination—also by the aid of immersion, as He however, succeed in finding the net of meshes in these investigators mention it. In the non-menstruating membrane is formed of cells so close together that no can the borders of the single cells be distinctly ob different methods of preparation, *nuclei only*, side by are oval or spindle-shaped (perhaps rather formed like thick all along), the latter, as a rule, arranged in stro smallest oval nuclei are sections of the bacillus-formed rather deeply by all the different staining media. T ranges from 3.7–5.9 $\mu$[1] one way, 1.5–2.9 $\mu$ the othe the bacillus-like ones from 5.9–10.3 $\mu$ : 1.5–2.9 $\mu$. Amo larger oval ones, that very much resemble endothelium but slightly stained, have one or two distinct nucle 4.4 $\mu$. This agrees in all essential points with the co mucous membrane of the uterus. Heinricius[2] is

[1] I am well aware that the decimal fractions of a micromi are not and cannot be exact. But I have preferred to give t

[2] *Loc. cit.*, p. 204.

that the results of his investigations agree with those of Leopold. It strikes me that if one lays such a new and important discovery as Heinricius' before the medical profession, then he really ought to use better and safer methods than simple staining with Bismark brown and microscopic examination in balsam.

While I, therefore, cannot agree with Heinricius in his statement, that the ground substance in the normal and inflamed uterine mucous membrane forms a net of meshes, I, on the other hand, perfectly agree with him that in endometritis we nearly always find *the chief mass of the interglandular tissue composed of two different kinds of nuclei, or rather of cells*, a discovery which former investigators, to be sure, have remarked, but without paying further attention to it.

In most cases of chronic endometritis we see in the interglandular tissue, (1) round or polygonal nuclei, slightly larger than a red blood corpuscle; they are brightly and generally evenly stained with carmine, hæmatoxylin and aniline colors; seldom they are slightly granular. In those cases where we can see the corresponding cell protoplasm, it is homogeneous, and forms a narrow border round the nucleus, the diameter of the cell usually being only twice as large as that of the nucleus. I shall, later on, notice the modifications which these cells undergo. (2) Larger oval nuclei of granular nature, usually provided with one or two distinct nucleoli.

These nuclei are but slightly stained by the above named staining media, so that the tissue where these nuclei are in the majority looks lighter, whereas it is darker there, where there are many of the cells spoken of under (1). If the corresponding cell-protoplasm be visible, it is slightly granular, and the quantity of it is always much greater in proportion than around the first-named cells. These cells which, let us say so at once, in their most exquisite form have the greatest likeness to the so-called decidua cells, can like the latter, have many different forms. I shall later on remark that we may also find other sorts of cells besides these two.

As stated above, Heinricius has also found these two kinds of nuclei, and he explains what he finds thus: That the large nuclei are the nuclei of the fixed cells of the connective tissue (endothelial cells); the small nuclei belong to immigrated lymph-cells. But I cannot agree with him in this explanation, for the following reasons: We found the tissue of the normal mucous membrane of the uterus composed of just those small cells with small, deeply-tinged nuclei, while the light nuclei were only present in small numbers, and did not, by far, reach the size they have in endometritis, or during the catamenial period. But even in the inflamed mucous membrane what he finds is not constant; it is possible, to be sure, although rare, to find an inflamed mucous membrane in which the interglandular tissue is formed almost exclusively of one kind of cells: small cells with a minute deeply-stained nucleus, while the light nuclei, which are also here, are proportionately few and small. Besides, we find in some patients distinct gradations between the two kinds of cells; nay, in some, the chief mass of the tissue consists of such cells, which we only with great difficulty can classify under one of the two sorts named. But during the catamenial period we find numerous large cells with large granular nuclei in the mucous membrane. I shall now review these points singly, and shall, therefore, at the same time, endeavor to give reasons for the explanation which I, after my researches, think ought to be given to the above-named condition, viz.: *1. The round cells with dark nuclei are those cells which, in the healthy state, form the chief mass of the interglandular tissue. 2. The large cells, that resemble decidua cells, are formed of the former ones by irritative processes (endometritis, menstruation, pregnancy). 3. The cells named in (1) can also become more spindle-shaped.* They are constantly so in the closest neighborhood of the glands, but not seldom we find them spread and scattered about in the tissue, just like connective tissue-cells.

Those cells whose nuclei are small, roundish, and deeply-stained, may be seen in Fig. 1. While red blood-corpuscles in the different preparations have a diameter of

from 3.7–5.9 $\mu$, mostly 4.4 $\mu$, most of these nuclei measure 5.5 : 4.4 $\mu$ (from 2.9–5.9 $\mu$), while the cell itself measures 10.0 : 8.8 $\mu$ (from 6–11.8 $\mu$). The nucleus itself is thus about the same size as those we found in the normal mucous membrane, or a little larger, while I, in this case, was unable to measure the cell itself. As aforesaid, these cells are always found in great numbers in the interglandular tissue, but still their number varies greatly. In some cases they make up quite half of the interglandular tissue; but, as before stated, we may also meet cases in which they form almost the whole of it, while there are but extremely few of the large, light nuclei. Among the twenty cases which I have investigated very thoroughly, I found this to be the case three times, viz., in the following patients :—

CASE I.—Forty-four years old ; seven births, the last eleven years ago, and four miscarriages, the last one nine years ago; considerable secretion; no menorrhagia. The mucous membrane resembled greatly a normal one.

CASE II.—Twenty-seven years old; four births, the last one three months since; severe hemorrhage. The mucous membrane was distinguished by an enormous wealth of glands; in many spots the glands were two-thirds of the whole tissue, and the interglandular septa were only 20–30 $\mu$ broad. Besides, solid epithelial cones projected from the glands out into the surrounding tissue. The mucous membrane, very much thickened, over 3.5 millimetres thick. Numerous vessels, chiefly arteries, with very thick walls. The interglandular tissue was composed of closely-packed nuclei, without distinct limits of the cells. Most of these nuclei were round or polygonal, slightly larger than a red blood corpuscle. Some of them were spindle-shaped. This was chiefly the case around the glands. But very few large (5.0 : 8.8 $\mu$), oval, slightly-stained nuclei.

CASE III.—Twenty-seven years of age; three births, with intervals of only one year, last one two years ago. Three months ago she miscarried in the second month of her fourth pregnancy, and since then almost continual hemorrhage. The pieces of the mucous membrane that were scraped out were more than two millimetres thick, with many vessels; but, besides, there is an enormous quantity of very much twisted glands. The interglandular tissue is composed of roundish cells (5.9–8.8 $\mu$ : 5.9–10.3 $\mu$) with deeply-stained nuclei half the size of the cell (4.4 : 5.9 $\mu$), among which are a few rather larger cells (9 $\mu$ : 10.3 $\mu$, the nucleus 6.0 $\mu$ : 6.0 $\mu$), but likewise with dark, not granular, nuclei.

We find in the interglandular tissue, formed of the two oft-named kinds of cells, some cells or nuclei which it is difficult to classify under either sort; are we to reckon them to one or the other? Thus, they can resemble the small nuclei in size, V-form, but are granular and but slightly stained. And if we examine them more closely we are often able to discover gradations from one species to the other. But these cells, which we neither dare bring under the one kind nor the other, form often the chief mass of the interglandular tissue. This is the case in both of the following patients:—

CASE IV.—Twenty-nine years old, single, one birth six years ago. Severe metrorrhagia during the last months, especially during the last six weeks. The mucous membrane, in part, in adenomatous degeneration. In other parts of it many vessels, chiefly small arteries. The interglandular tissue is composed of closely-packed nuclei (protoplasm not distinctly visible); they were spindle-shaped, 7.3–14.7 $\mu$ long (mostly 8.8), 1.5–2.9 $\mu$ broad (mostly 2.2). They were but slightly stained, were somewhat granular. However, there were also smaller nuclei, both round and spindle-shaped, which were deeply stained, but there was a decisive majority of the former ones.

CASE V.—Forty-six years of age, nine births and four miscarriages; her last child was born nine months ago, and since frequent hemorrhages. The glands somewhat more numerous, expanded and twisted, than in normal state. Enormous quantity of vessels, chiefly arteries of middle size. The borders of the cells indistinct. There were dark small nuclei (4.4 $\mu$: 3.7 $\mu$) and larger oval, slightly-stained nuclei (7.3 $\mu$ : 6.0 $\mu$),

but most of the nuclei are between these two with respect to their size, form and appearance.

I have mentioned that we often find spindle-shaped cells—cells resembling those of connective tissue, and that they are chiefly found surrounding the glands. They can, however, also appear elsewhere in the tissue. We sometimes even find them in broad bands, although I never saw this so exquisitely developed as it seems to have been in the cases which Schröder[1] describes by the name of endometritis dysmenorrhœa. We find in some patients gradual transitions from the common cells with the round nuclei to the spindle-shaped cells; in others, transitions from the small, spindle-shaped cells with dark nuclei to large spindle-shaped cells with granular protoplasm and oval, slightly granular, light nucleus. Such gradatory cells may be seen in Fig. 2. We often find, in the interglandular tissue, cells whose nuclei are dividing or have already divided. I am unable to decide whether these cells are immigrated lymphoid cells (pus cells), or whether they are the cells originally present in the mucous membrane. But we often see the tissue infiltrated with quantities of small, round, very deeply-stained nuclei whose diameter is 3–4 $\mu$. Without any doubt these are immigrated lymphoid cells, and in one case I saw them gather in small, round heaps, immediately under the epithelium, *i. e.*, forming small abscesses, about 0.2 $\mu$ in diameter.

If we now turn our attention to *those cells which have a large, oval, granular nucleus*, which are but slightly stained by those staining media we generally use, we have already seen that they may be more or less completely wanting. But in the great majority of cases of chronic endometritis we find them there, and they are, as a rule, quite as numerous as the first-named sort of cells. As these cells can highly resemble the so-called decidua cells, not only by those peculiarities which we already have noticed, but also—as we soon shall see—by the form and size of nuclei and cells, it might really seem proper to suppose that this was their real origin; that they originated in a pregnancy, and this supposition is by so much the more probable, as we, for instance, from Küstner's[2] researches are well aware of the fact that decidua can be retained in the uterus after parturition or miscarriage; it can be altered in its structure, and prevent the regeneration of the normal mucous membrane. In some patients, where the malady, *i.e.*, the hemorrhage, was developed in direct connection with a birth or a miscarriage, we may also find parts of the curetted tissue that are almost solely composed of genuine decidua cells, as may be seen, for instance, in Fig. 3. The case in point is a peculiar one.

CASE VI.—The woman was twenty-seven years of age; had given birth twice in due time, last time two and one-half years ago; then she had miscarried twice in the sixth week of pregnancy; she is unable to say when it happened, but it was, at all events, long ago. Her menses were normal until a fortnight ago, when a severe hemorrhage set in at the time she expected the catamenia. A polypus, as large as the last phalanx of a finger was found in the uterine cavity, and, besides, the mucous membrane was velvety and thickened. The polypus proved a genuine placenta-polypus, formed by villi chorii and decidual tissue, besides coagulated blood. Several parts of the mucous membrane were chiefly composed of cells like those in the drawing; the tissue was infiltrated with blood, and there were many pus cells; in several places villi chorii were found. But other parts resembled a mucous membrane in a common chronic endometritis, with the two kinds of nuclei among each other. The diameter of the cells in the drawing was 17.6–23.5 $\mu$ : 8.8–17.6 $\mu$ the size of the nuclei 11.8 $\mu$ : 8.8–11.8 $\mu$. Genuine decidua-cells appeared in the following case in a rare way :—

CASE VII.—The patient, thirty-two years old, had given birth to five children, last time three years ago, and has since then suffered from hemorrhage. Two months ago a miscarriage in the third month. The parts scraped out showed a very varied structure.

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[1] *Loc. cit.*

[2] Beiträge zur Lehre von der Endometritis. Jena, 1883.

Part of the tissue was evidently in adenomatous degeneration, and here the interglandular tissue consisted of the first-named small cells, with dark, round, or spindle-shaped nuclei. In other parts, the glands were, to be sure, numerous and greatly distended, but no adenoma formation; numerous vessels; the interglandular tissue was composed of small cells with roundish, dark nuclei; and, besides, of larger spindle-shaped cells with light granular nuclei (the nucleus measured 8.5–14.5 $\mu$ : 8.5–4.5 $\mu$; most of them 9 $\mu$ : 6.5 $\mu$); the latter cells were, however, not to be found in the deeper layers. In this tissue was seen at one single spot what I have endeavored to reproduce in Fig. 4. Close to the surface, and probably reaching it, lies a piece of tissue, 130 $\mu$ broad and 24–65 $\mu$ high, formed by very large decidua cells (some of these are shown in Fig. 5), and scattered about here and there are a few pus cells. The diameter of the large decidua cells was 26.5–32.3 $\mu$ : 20.6–17.6 $\mu$, that of the nuclei 11.8 : 8.8–8 $\mu$.

If we were now tempted to draw the conclusion that the decidua-like cells in endometritis have their origin in a previous pregnancy, we should, however, be just as much mistaken as if we believed that these cells were always to be found, when the commencement of the disease might be dated from a birth or a miscarriage. With respect to this point I need only refer to Cases II, III and V, mentioned before; in all three the decidua-like cells were entirely wanting, although the disease, without the slightest doubt, originated in a birth or miscarriage. And as to the former point, that the cells that resembled decidua-like cells really should be descended from genuine decidua cells, we can very easily prove that this is by no means the case. For not only do we find them (or the nuclei, in those cells in which the confines of the cells are not distinct), in patients whose last pregnancy is far away, while they are wanting in others (see Cases I and IV), but the decisive point is, *that we can find them in nulliparæ*, nay, in *doubtless virgines intactæ*. To be sure it is a very difficult matter to be *certain* that a woman is a virgin, but when the genital organs in every respect bear signs of virginity, and when (as is the case in the first-named of the following cases) the family physician, who has known her intimately a very long time, is perfectly convinced of her virginity, then it would be unreasonable to doubt it.

CASE VIII.—The patient, twenty-eight years of age, has, during six to seven years, suffered from frequent and lasting attacks of menorrhagia; the uterus is slightly enlarged; no tumors; by aid of the curette great quantities of very thick mucous membrane were removed; it is above 6 mm. in thickness; the surface smooth, covered with a low ciliated columnar epithelium (17.6 $\mu$–7.4 $\mu$); the glands, numerous and very much distended, form the chief mass of the tissue; there are many vessels, chiefly arteries. The interglandular tissue is formed by two kinds of cells, some large ones resembling decidua cells, others smaller, with dark nuclei; spindle-shaped cells around the glands. Fig. 6 shows partly a group of these different cells, partly some few decidua-like cells and nuclei. If we compare these with genuine decidua cells, the similarity will be striking. Fig. 7 shows a piece of the decidua from a miscarriage in the second month. The cells with dark nuclei are probably pus cells (foul abortion-*débris*). The decidua-like cells in our virgin were of the following size: One of the largest, 20.6 $\mu$ : 17.7 $\mu$; the nucleus, 10.3 $\mu$ : 10.3 $\mu$. The others were 13.16 $\mu$ : 12–16 $\mu$; the nucleus, 7.5 $\mu$–9 $\mu$ : 6–9 $\mu$. One more spindle-shaped cell measured 26.5 $\mu$–5.9 $\mu$; the nucleus, 11.0 $\mu$ : 5.5 $\mu$. The second case of endometritis hyperplastica chronica in a virgin is the following:—

CASE IX.—The patient is twenty-three years old; very chloro-anæmic. The catamenia regular, but profuse; last time, twenty-three days ago; a week thereafter a severe hemorrhage commenced, which has continued since. The genital organs exquisitely virginal. The considerable mass of mucous membrane that was removed proves to consist of numerous twisted glands and many vessels, that suffer from evident endarteritis. The interglandular tissue consists of common cells with round, dark nuclei (some of them are seen in Fig. 1, c.), and besides, of cells resembling those of decidua.

(Fig. 1, c. and 8.) These latter were somewhat smaller than in the preceding patient; they measured 11.8–16.2 $\mu$ : 8.8–10.3 $\mu$; the nuclei, 6.6–9.5 $\mu$ : 5.5–7.3 $\mu$. *Leopold*[1] also states a case in which he, in a woman with "virginal genitals," found cells resembling decidua cells in the uterine mucous membrane; this was during the catamenial period; but I shall later on return to this case.

With respect to those patients who, to be sure, have given birth or miscarried, but where this was a long time previously, and where we cannot regard the endometritis as having any connection at all with pregnancy, in these cases we also find these decidua-like cells. For instance, I may state that I have found this to be the case in a woman seventy-four years old.

CASE X.—She had given birth seven times; the menopause was in her forty-fifth year. She had suffered from hemorrhage during four months. I found a small mucous polypus, and, besides, the mucous membrane was much thickened. The smooth surface was covered by a tall, ciliated, columnar epithelium (23.5–26.5 $\mu$ : 3.7–4.4 $\mu$); the glands enormously distended; the interglandular tissue consisted of a homogeneous or delicately fibrillated stroma, in which were small, round, deeply stained nuclei, and others larger, oval, granular and faintly tinged, lying close to one another. The limits of the cells indistinct. While most of the dark nuclei measured 3.9 : 3.7 $\mu$, most of the light ones measured 10.3–5.9 $\mu$. In most of the other patients they were larger, the nuclei especially were larger in proportion than they are wont to be in decidua cells. As examples, the following measurements from three patients may be given: 14.0 $\mu$ : 14.0 $\mu$; nucleus, 10.3 $\mu$ : 8.8 $\mu$. 11.8–15.0 $\mu$ : 11.0–15.0 $\mu$; the nucleus, 7.4–12.0 $u$ : 7.4–8.8 $\mu$. 18.0 $\mu$ : 15.0 $\mu$; the nucleus, 11.5 $\mu$ : 6.0 $\mu$. These decidua-like cells can also, as stated, become perfectly spindle-shaped (see Fig. 2). Such a cell measured 35.3 $\mu$ : 5.5 $\mu$; the nucleus, 11.8 $\mu$ 5.9 $\mu$. I must here remark that *I have found such cells quite similar to decidua-like cells in the mucous membrane during menstruation*, and I stated above that Leopold had made a similar discovery in a virgin, and by chance the menstruating uterus which I examined was likewise that of a virgin. Also, here were found closely-packed nuclei, but it was, however, also possible, in many cases, to see the limits of the cells themselves. There were small cells with small, round, or long-drawn, deeply-stained nuclei, and innumerable transitions from these to large decidua-like cells, with oval, or round, granular, slightly stained nuclei. But most of the dark nuclei were larger than in the healthy mucous membrane I described first; many of them were 6 $\mu$ every way (red corpuscles were but 5 $\mu$). One of the largest of these decidua-like cells measured 26.6 $\mu$ : 16.2 $\mu$; its nucleus, 8.8 $\mu$ : 10 3 $\mu$; many measured 14.7 $\mu$ : 11.8 $\mu$, with nucleus measuring 9.0 $\mu$ : 8.5 $\mu$. Some few nuclei were still larger, 11.8 $\mu$ : 8.1 $\mu$.

However, it seems that these decidua-like cells are not always present in the menstruating (nor in the inflamed) mucous membrane, and this is shown by the fact that Leopold,[2] in the mucous membrane that he described, which was in the stage immediately preceding menstruation, only found small cells with nuclei that almost filled the whole cell.

As Leopold[3] has found *giant cells* in the mucous membrane during the catamenial period, and as they are also to be found in the decidua of pregnancy, it seemed reasonable to me to endeavor to find them in my preparations. I was not able to observe any in the deep layers near the muscularis, where Leopold chiefly found them, and they were altogether wanting in most of my preparations. I found them in the following two patients only.

CASE XI.—A woman, forty years old; three births, the last of which was four and a half years ago; no miscarriage; menorrhagia during the last year's time; the uterus

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[1] *Arch. f. Gyn.*, Bd. II, pp. 119, 120. [2] *Ibid.*, p. 132. [3] *Ibid.*, p. 116.

was enlarged; a considerable quantity of mucous membrane was removed; it showed the following structure: The glands were somewhat less numerous than in the normal state, and they were even perfectly wanting in large tracts; the surface was papillomatous and uneven; I shall speak of the superficial epithelium in a subsequent part of my paper. Besides the common two kinds of cells that here, as elsewhere, formed the greater part of the body of the tissue, there were many cells with divided nuclei. This was principally the case close to the surface, where you may see figures resembling the one in Fig. 9. There are large giant cells, formed by fusion of many smaller ones, with divided nuclei. The largest of these giant cells measured 32.4 $\mu$ : 23.4 $\mu$ ; another one, 32.1 : 17.7 $\mu$. In one of the patients I mentioned above, Case IV, there were likewise, close under the surface, numerous cells in division (pus cells?)—besides giant cells.

What I have described here must be sufficient to confirm the ideas put forward in the above, which I might also express thus: *The interglandular tissue of the uterine mucous membrane is composed of cells that mostly resemble embryonal cells. Like these latter, they are able to suffer many transformations, become spindle-shaped, and so on. But above all, they seem to be liable, under the influence of irritative processes, normal (menstruation, pregnancy) or pathological (inflammation), to undergo a change, the final stage of which is the decidual cell in its most exquisite form.*

Thus these inquiries lead to results in direct opposition to Wyder's[1] opinion, that the formation of decidual cells is a phenomenon proper to pregnancy. And they are just as positively in favor of the opinion that the decidua cells descend from the cells of interglandular tissue. As to the latter question, it would lead us too far were I to discuss all that has been written concerning the origin of the decidua cells. I shall, therefore, limit myself to stating that, at present most investigators agree with the opinion put forth, for instance, by Friedländer[2] and Leopold,[3] which is in harmony with the conclusions at which I have arrived in my investigations. I made them a couple of years ago, although they are only published now, and in the interval two papers have appeared which are devoted particularly to the origin of the decidual cells, which I shall therefore mention shortly. One is by Overlach: "Die pseudomenstruirende mucosa uteri nach akuter Phosphorvergiftung."[4] On examining the uterine mucous membrane of a woman who died of acute phosphorus poisoning, he found it in a state which he thinks proper to call pseudo-menstruation (better, perhaps, acute inflammation), and he found numerous cells very similar to decidua cells in the interglandular tissue. With respect to the origin of these cells, he arrives at the conclusion that *they are of epithelial origin*, and he believes that they chiefly descend from the tall, narrow epithelium of the cervix, and wander hence into the mucous membrane of the corpus. I have not a single time, in my researches, met with anything that could support such an opinion, although I have very often examined the mucous membrane of the upper part of the cervical canal. Nor have I found any other investigator who has confirmed Overlach's startling discovery (although, to be sure, it is said that decidua can be developed from the mucous membrane of the cervix; thus in the second of R. Maier's[5] well-known cases, the "Deciduom" originated in the mucous membrane of the cervix.) So, we must as yet suppose that acute phosphorus poisoning provokes a specific morbid alteration of the uterine mucous membrane, and the results of this cannot, without further evidence, be brought to bear on other matters.

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[1] *Loc. cit.*

[2] Physiologische anatomische Untersuchungen über den Uterus, Leipzig, 1870, p. 8.

[3] *Arch. f. Gyn.*, Bd. II, p. 450 and pp. 461–462.

[4] *Arch. f. mikroskop. Anatomie*, Bd. 25, pp. 191–235.

[5] *Virchow's Arch. f. Pathol. Anat.*, Bd. 67, pp. 55–71.

The other paper is by Walker, and treats of the anatomy of the membranes of the ovum in extra-uterine pregnancy.[1] He here arrives at conclusions that essentially agree with mine, viz., that decidua cells descend from connective tissue cells, and that we find gradual gradations between these two kinds of cells, while the endothelium of the vessels has nothing whatever to do with the origin of the decidua cells.

### II. THE LINING EPITHELIUM.

Still less attention than to the interglandular tissues has, with a single exception (Zeller, v, i), been given to the changes which *the lining epithelium* may undergo during chronic endometritis. The only statement usually found about the epithelium lining the healthy mucous membrane of the corpus uteri is, that it is a ciliated columnar epithelium. Hennig[2] gives its length from 10–30 $\mu$; Moericke,[3] from 16–28 $\mu$. The last named author adds that the shape may be altered by the mutual pressure of the cells.[4] About the mucous membrane during *menstruation*, Wyder[5] states that its surface is partly villous, and here and there is lined by a columnar epithelium.[6] In cases of membranous dysmenorrhœa, he has found the epithelium tesselated 12 $\mu$ high.[7] Olshausen[8] mentions that in cases of endometritis fungosa, the epithelium does not present changes from the normal state. Ruge[9] states that the surface is lined with columnar epithelium, is smooth or slightly papillary, warty. A more detailed account of the changes which the epithelium may undergo in cases of endometritis, is only given by Zeller,[10] and this author has mainly given attention to the appearance of *squamous epithelium* in the womb. However, he states[11] (like Moericke) that the cells rarely are *strictly cylindrical;* as a rule they are conical, or pyramidal. He further mentions the frequency with which are found excrescences and villi on the surface. With regard to the squamous epithelium, he has very often found it; the cells even often changed into horny scales (wherefore he speaks of an ichthyosis uterina). In the same case he now finds columnar and now squamous epithelium, and also both forms beside each other. He has examined four cases of endometritis fungosa, and in each case he found squamous epithelium.

Though it is now three years since these researches were published, at about the same time that Küstner[12] had found squamous epithelium lining a mucous polypus springing from the cervical canal, I have not found one single author who has published similar results. Heinricius[13] states expressly that he never has found squamous epithelium. It was mainly Zeller's paper which made me enter into these researches; but *not in a single case have I been able to find squamous epithelium lining the mucous membrane* curetted from the corpus uteri.

Before going on to describe the character of the epithelium in the cases of chronic hyperplastic endometritis which I have examined, I shall mention the character of the epithelium in the above-mentioned mucous membrane from the patient who died from uræmia (six months p. p. ; lactation). The surface was rather smooth. It was lined with a single layer of columnar epithelium ; the cells were narrow, not very high. The

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[1] *Ibid.*, Bd. 107, Hft. 1, pp. 72–99.

[2] Katarrh der inneren weibl. Geschlechtsorgane. Leipzig, 1882, p. ii.

[3] *Zeitschr. f. Geburtsh. u. Gynäk.*, Bd. vii, Hft. 1, p. 107 cfr., p. 99.

[4] *Ibid.*

[5] *Loc. cit.*, p. 21.

[6] I shall not here enter further into dispute, whether the epithelium is lost during menstruation, or whether it remains wholly intact.

[7] *Loc. cit.*, p. 26.

[8] *Loc. cit.*, p. 104.

[9] *Zeitschr. f. Geburtsh. u. Gynäkol.*, Bd. v, p. 320.

[10] *Ibid.*, Bd. XL, pp. 56–88.

[11] *Ibid.*, p. 60.

[12] *Crbl. f. Gyn.*, 1884, No. 21, p. 320.

[13] *Loc. cit.*, p. 206.

measurements were 11.7–17.7 $\mu$ : 3.7–4.7 $\mu$ (most of t measured 6.0–8.8 $\mu$ : 2.8 $\mu$–4.4 $\mu$. In this place we above-described case (N. 1[1]) in which the patient did in which the mucous membrane did not differ visibly f cylindrical cells showed the following measurements: 8.8 $\mu$ : 3.7–4.4 $\mu$.

Only in a few of the cases of chronic inflammati found so small, or even smaller. In Case No. V the cell 5.6 $\mu$; the nuclei 7.4–8.8 $\mu$ : 2.9 $\mu$. In Case No. II, the 7.4 $\mu$; the nuclei, 8.8–12.0 $\mu$ : 4.2–5.9 $\mu$. In Case No. quite smooth, the epithelial cells were proportionall 11.8 $\mu$; the nuclei, 5.9–11.8 $\mu$ : 4.4–6.0 $\mu$ (most of th cases the cells are alike longer and broader than th normal mucous membrane. But sometimes we also In one case, for instance, the measurements were 2 7.4–8.8 $\mu$ : 1.7–3.7 $\mu$; in another case (No. 10), 23.5–26 11.8 $\mu$ : 3.1 $\mu$. In this case, where the patient was seve character of the cells was plainly visible, which is at Moericke[2] that the epithelium loses the cilia at an adv

Nevertheless, in all these cases the epithelium had type. The cells usually stained rather brightly, as di lated nuclei, which were seated near the basis of the *the epithelium changed character altogether*, the cells tool or the epithelium grew villous, etc., which I am now ab instead of being rather smooth, frequently had an une changes could assume a very high degree.

In the following case the epithelium presented a k mal shapes.

CASE XII.—Thirty-six years of age; has borne tv years ago, and miscarried twice, the last time before la severe menorrhagia. The surface is uneven, with bro the epithelium is seen in Fig. 10. The measurement nuclei, 11.2–14.7 $\mu$ : 4.4–5.1 $\mu$.

In the following case the epithelium resembled the fan-like shape.

CASE XIII.—Fifty-three years of age, four delive last one ten years ago. One year ago she was treated f mucous membrane, but three months ago the hemorrh is rather smooth. The epithelial cells are long, narr nuclei near the free, thick end, as seen in Fig. 11. The 3.1–8.8 $\mu$ (most of them 4.4 $\mu$ broad; the nuclei, 7.4–16

In Case IV it was mentioned that there were found the nuclei becoming divided just below the epitheliu of the mucous membrane (I was not able to find the li nomatous parts). The shape of the epithelial cells w still presented the cylindrical type, but had the free en were found transitions to the club-shaped cells seen in these four cells varies from 22.0–35.3 $\mu$ : 3.7–8.8 $\mu$; the

[1] These numbers refer to the cases mentioned in th

[2] *Loc. cit.*, pp. 114 and 119.

In the following cases the character of the surface and the epithelium is still more different from the normal state.

Case VII is mentioned in the first part of this paper. The surface is partly rather smooth, partly it offers smaller and larger prominences, and this, combined with the circumstance that the openings of the glands are dilated into a funnel-shape, may produce such an appearance as the one seen in Fig. 13, where one of the prominences is narrowed at the basis like a little polypus. The lining epithelium is polymorphous to such a degree that we may find cells of very different types in the same section. A large part of the surface is lined with a low, proportionally broad columnar epithelium. The measurements are 11.8–14.7 $\mu$ : 4.4–7.4 $\mu$, the nuclei 5.5–7.4 $\mu$ : 3.7–5.1 $\mu$. Near up to these cells long and very narrow cells may be found measuring 23.5 $\mu$ : 1.5 $\mu$, the nuclei 11.8 : 1.5 $\mu$. Further on we find fan-shaped, or pyramidal cells (Fig. 14), with a long process at the base, and transitions from these to long, narrow, fan-shaped cells, and from these again to the long, narrow cylindrical cells already mentioned. The cells with processes are (the process included) 20.6–26.5 $\mu$ long (whereof the process is 5.9–11.7 $\mu$), 3.7–8.5 $\mu$ broad, the nuclei 5.9–8.8 $\mu$ : 3.7 $\mu$. The long, fan-shaped cells are 23.5–26.5 $\mu$ long, 2.2 $\mu$ broad near the basis, 5.9 $\mu$ at the broad end; their nuclei measure 8.8–10.3 $\mu$ : 1.5–4.4 $\mu$. In the adenomatous parts from this patient I have not been able to discover the lining epithelium.

Case XI is also mentioned in the first part of this paper, and the giant cells found direct under the surface were described and figured (Fig. 9). The surface itself is rarely smooth, most frequently uneven, with broad papillæ, but never to such a degree as in the case last mentioned. The character of the lining epithelium varies very much, but most frequently its character is like that seen in Figs. 15, 16 and 17. The shape of the single cells resembles mostly a club, but they appear like separated bushes, and frequently seem to spring radially from an edge, which runs vertically through the middle of such a bush (like a Christmas tree), through which the surface of the membrane receives a villous aspect. Such epithelial bushes may reach a height of 121 $\mu$, the ones seen in Fig. 15 are 88.2 and 85.3 $\mu$ high. The measurements of the single cells are 32.4 –41.2 : 8.8 $\mu$. In other parts we find a nearly true columnar epithelium; the measurements are 14.7–20.6 $\mu$ : 6.0–8.8 $\mu$; the nuclei 7.5–9.0 $\mu$ : 4.5–7.4 $u$. From these cells transitions are again found to very long and narrow cylindrical cells (Fig. 18) 29.5–47.0 $\mu$ : 3.0–4.4 $\mu$; the nuclei 9.0–29 $\mu$, and from these again to long, club-shaped cells, 32.4–44.1 $\mu$ long. The part of the mucous membrane poor in glands is lined with a stratified epithelium of pear-shaped cells. The epithelial layer is 29.4–41.2 $\mu$ high; the height of the single cells is difficult to measure, but they are 8.8–9.0 $\mu$ broad; the nuclei measure 9.0-10.3 $\mu$ : 6.0–8.5 $\mu$.

In Case VI, where we find a placental polypus, parts of the mucous membrane were lined with a bushy, villous epithelium, similar to that described in the foregoing case. The cells were club shaped, with the nucleus at the dilated end. The measurements of these cells are 14.7–20.6 $\mu$ : 4.4–5.9 $\mu$, of their nuclei 5.9 $\mu$ : 2.9–3.7 $\mu$. Other parts of the surface of the mucous membrane present broad, flat papillæ, lined with columnar epithelium, whose cells measure 14.7–17.7 $\mu$ : 5.9–7.4 $\mu$, their nuclei 8.8 $\mu$ : 3.0–5.5 $\mu$.

As was to be expected, these researches prove that *the lining epithelium takes a great part in the morbid changes going on in the mucous membrane during chronic inflammation.* Not only that the surface can become uneven, papillous, nearly polypous—not only that a lively throwing off and regeneration of epithelium takes place, but the epithelium may change character altogether; its cells may become long and thin or narrow, short and broad, may take a pear, a club, a fan shape, etc., and, lastly, it may present a bushy, villous character.

## EXPLANATION OF THE PLATES

### ILLUSTRATING DR. LEOPOLD MEYER'S PAPER ON THE MORBID ANATOMY OF CHRONIC ENDOMETRITIS.

FIGURE 1. Small round cells with brightly-staining nucleus. Magnified 550 times.
- *a.* From Case XII.
- *b.* From Case XI.
- *c.* From Case IX.
- *e.* Decidua-like cells.

FIG. 2. Gradual transition from round to spindle-shaped cells (Case XII), and transition from spindle-shaped to decidua-like cells. Magnified 550 times.

FIG. 3. True decidua cells (Case VI). Magnified 550 times.

FIG. 4. Piece of decidua in the mucous membrane (Case VII). Magnified 30 times.
- *a.* Decidua.
- *b.* Lining epithelium.
- *c.* Section of gland.
- *d.* Large blood vessel.

FIG. 5. Decidua cells, from *a*, FIG. 4. Magnified 550 times.

FIG. 6. Different kind of cells from Case VIII. Magnified 550 times.

FIG. 7. True decidua (inflamed). Magnified 550 times.

FIG. 8. Decidua-like cells, from Case IX (Compare Fig. 1, *c e*). Magnified 550 times.

FIG. 9. Giant cells, etc., from Case XI. Magnified 550 times.

FIG. 10. Lining epithelium, from Case XII. Magnified 550 times.

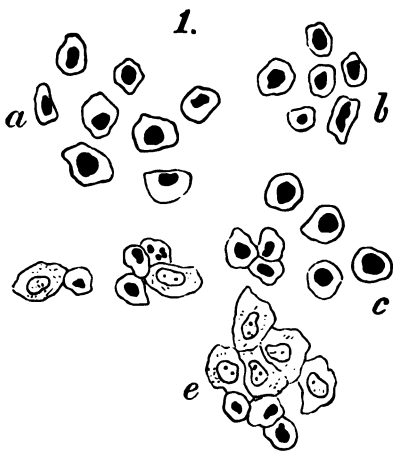
FIG. 11. Lining epithelium, from Case XIII. Magnified 550 times.

FIG. 12. Lining epithelium, from Case IV. Magnified 550 times.

FIG. 13. Surface of the mucous membrane (Case VII). Magnified 110 times.

FIG. 14. Epithelial cells, from Case VII. Magnified 550 times.

FIGS. 15, 16 and 17. Lining epithelium, from Case XI. Magnified 550 times.



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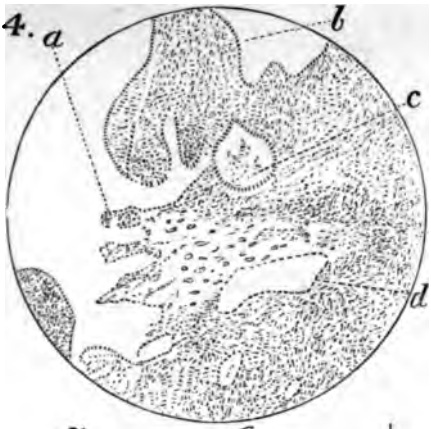


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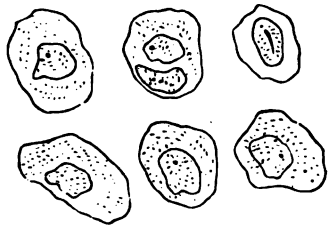

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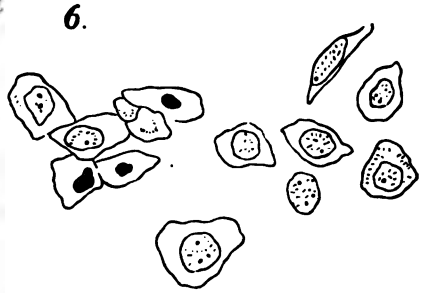

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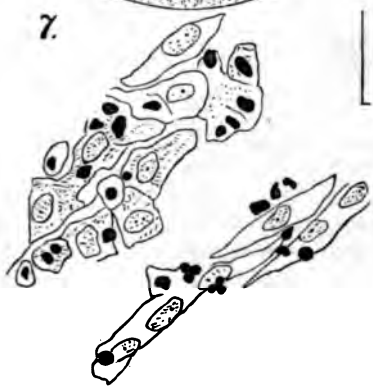

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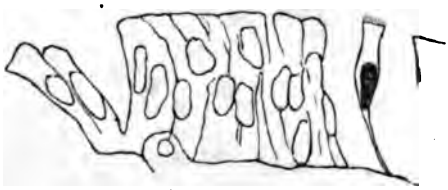

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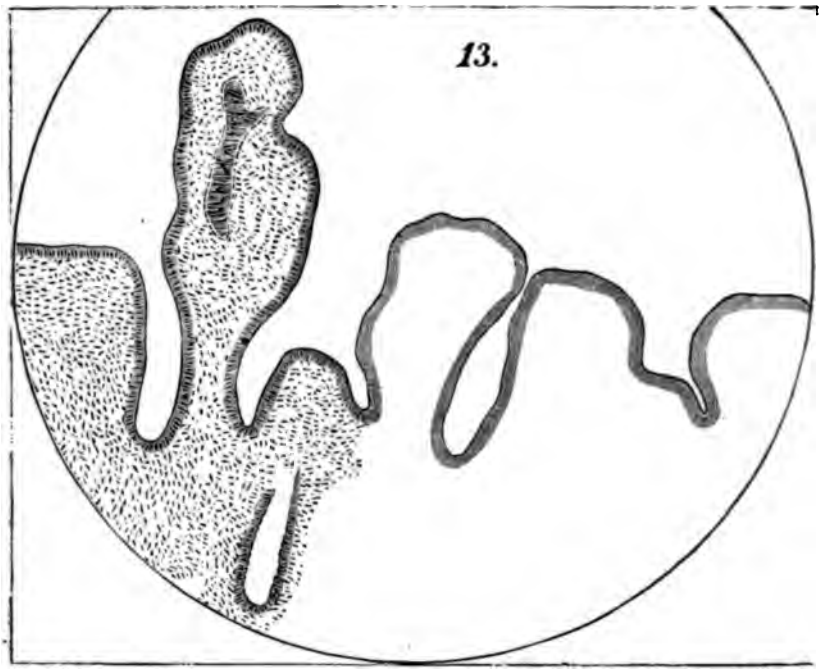
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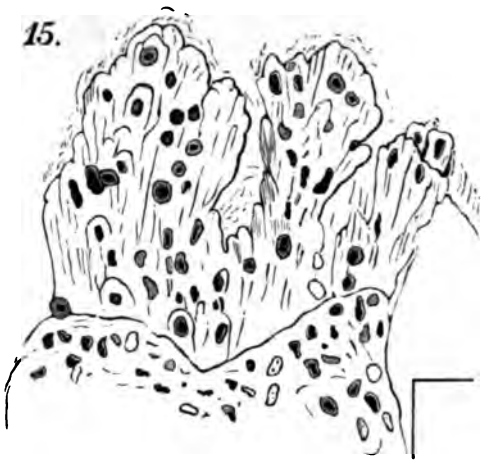
15.

16.

17.

18.

Dr. J. W. JONES, Tarborough, N. C., contributed a paper, entitled—

# AN ANTISEPTIC DRESSING FOR THE TREATMENT OF WOUNDS; ESPECIALLY APPLICABLE TO GYNÆCIC SURGERY.

## UN PANSEMENT ANTISEPTIQUE POUR LE TRAITEMENT DES BLESSURES APPLICABLE SPÉCIALEMENT À LA CHIRURGIE GYNÉCIQUE.

## EIN ANTISEPTISCHER WUNDVERBAND, INSBESONDERS IN DER GYNÄKOLOGISCHEN CHIRURGIE ANWENDBAR.

The after-treatment in many cases of surgery is equal in importance to the operation itself. While all the antiseptic methods should be made available before and during the operative procedure, it is also of great importance that they should not be neglected in the subsequent treatment. The antiseptic dressing which is the subject of this paper is applicable to all surgical interferences on the human body—incisions, lacerations and amputations. It is especially suitable to parts where bandages are difficult of application or cumbersome—for the abdomen, perineum, face, head and hands.

It consists of a material that holds the parts in place during the reparative process. It is impermeable to air and a protector against any septic infection that may be in the air; in this respect it serves as the diver's suit, that protects the diver from the watery elements that would take his life, in the midst of which he walks and does his work. It is insoluble in water, and its integrity is not interfered with by moisture. Its styptic power is very great, and acts admirably in hemorrhages from the smaller vessels, lacerated wounds and cancerous growths. As a support for the spine, dislocations and fractures, it serves well the place of the splint, starch and plaster-of-Paris bandages. After it has dried and become hard, portions of it may be cut away, sufficient to expose the parts under it requiring inspection or redressing.

Since the material of the dressing is so common, and the method of its application is so simple, I shall give only these, without any cases of illustration.

I prepare, extemporaneously, the following mixture, as required:—

| | | |
|---|---|---|
| ℞. | Tinct. benzoin comp., | 60 parts. |
| | Spts. turpentine, | 25 " |
| | Tinct. ferri chloridi, | 15 " |

When the wound is ready for dressing, I cover it and the surrounding parts sufficiently to give the needed support, with thin layers of absorbent cotton saturated with the mixture; then with a compress of cotton or soft cloth I gently press the cotton enough to mould it closely to the parts, and absorb any excess of the mixture there may be in it. Two layers of the cotton, applied at intervals of a few minutes, are ordinarily sufficient. When used to serve the place of splints, four or five layers should be applied, to give the requisite hardness and solidity. A few hours after the application, it dries into a dark, hard, firm dressing, impermeable by air and insoluble by water. A moderate amount of blood that may mix with the dressing in the application seems to add to its adhesive qualities. In some cases I have added tinct. opii for the immediate relief of pain; also, occasionally, some iodoform or stronger germicide, for the better protection from infection.

Since I commenced the use of this dressing, I have rarely required any other, or a bandage of any sort, securing by it all the support and protection that seems to be needed. For minor cases I frequently make the dressing in my office and never see the patient again.

Before applying the dressing, carefully wash the wound and surrounding parts with a mercuric-bichloride solution one to one thousand, and approximate by sutures when

required. After the dressing has dried, it will hold the parts firmly in place. I never attempt to remove it until it is loosened by the process of nature. If union by first intention should fail to take place, and suppuration should ensue, which is the decided exception, I either cut a sufficient fenestra to allow the escape of pus and careful cleansing of the wound, or I remove the dressing entirely and re-apply as at first.

The advantages to be obtained from this dressing may be summarized as effective, simple and easy of application. Effective in hermetically sealing from infection an aseptic wound. A soft, plastic, mildly antiseptic application, easily adapted to irregular surfaces, which, when hard, gives a firm support.

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D. J. Veit, Berlin, Germany, contributed a paper, entitled—

## ÜBER PLASTISCHE OPERATIONEN AN DEM DAMM.

### ON PLASTIC OPERATIONS UPON THE PERINEUM.

### SUR LES OPÉRATIONS PÉRINÉO-PLASTIQUES.

In neuerer Zeit sind die Operationen, welche der Wiederherstellung des Dammdreieckes, der Verengerung der Scheide und der Neubildung des Mastdarmverschlusses bei Frauen gewidmet sind, durch vielfache Arbeiten wesentlich gefördert worden. Trotzdem aber hat sich weder unter den einzelnen Operateuren, noch unter den verschiedenen Nationen vollständige Uebereinstimmung erzielen lassen.

Darin ist man allerdings jetzt vollständig einig, dass jeder Mastdarmdammriss und jeder grössere Vorfall operirt werden muss, wenn es sich um Frauen in nicht zu vorgeschrittenem Alter handelt. In Bezug auf letztere Einschränkung braucht man meiner Ueberzeugung nach nicht zu engherzig zu sein. Bis zur Mitte der 60er Jahre und noch etwas darüber kann man diese Encheiresen vornehmen und wird häufig genug eine volle Befriedigung über den Erfolg erleben können. Ob man, wie *Küstner* neuerdings empfohlen hat, in der Ausdehnung der Indicationen zur Dammplastik bis auf jede kleine Narbe im Scheideneingang gehen soll, wird von der Ansicht der Aerzte noch abhängen müssen. Ich selbst stehe keinen Augenblick an, jeden Dammriss, welcher Beschwerden macht, der Operation zu unterwerfen, wenn ich auch nicht jedes Mal, sobald ich den Rest einer kleinen Verletzung erblicke, zum Messer greife. Doch scheint es mir nicht nöthig, hierüber viel zu discutiren, weil natürlich der Eingriff als solcher sehr viel geringfügiger, und der Entschluss zur Operation daher sehr viel leichter wird, je kleiner die vorliegende Verletzung ist. Die Hauptsache, welche mir einer Besprechung gerade auf einer Zusammenkunft von Gynäkologen aus den verschiedensten Ländern würdig erscheint, ist die Wahl der Operationsmethode. Fürchten Sie nicht, dass ich dem Beispiele der meisten Autoren, welche in jüngster Zeit diesen Gegenstand behandelt haben, folge, indem ich Ihnen eine neue Anfrischungsfigur empfehle. Ich stehe auf dem Standpunkte, dass die meisten der angegebenen Verfahren eine gewisse Empfehlung verdienen, ja ich gehe so weit, dass ich jede Methode der Dammbildung anerkenne, wenn sie nur mit einer mässigen Verengerung der Scheide und des Scheideneinganges wirklich ein Dammdreieck bildet. *Jede Anfrischungsfigur*, welche dieses Ziel in dem *Momente der Beendigung der Operation erreicht* hat, ist *principiell richtig*. Die Erreichung des dauernden *Erfolges hängt* einzig und allein

von der *absoluten prima intentio* ab. Letzteres Ziel liegt nicht in der Wahl des Verfahrens, sondern ganz ausschliesslich in der Antiseptik bei der Operation.

Dieser Standpunkt überhebt mich wohl an dieser Stelle der ausführlichen Auseinandersetzung über die Methoden der Antiseptik bei der Operation. Es versteht sich von selbst, dass ich vollständige Aseptik der Instrumente und der Hände des Operateurs, ebenso wie des Operationsfeldes, verlange. Während der Operation wird man durch mässiges, dauerndes oder vorübergehendes Berieseln der gesetzten Wundfläche die Sicherung dieses Zieles erreichen. Ich benutze zu letzterem Zwecke Lösungen von Sublimat (0.5–1.0 : 5000), und ich kann dieser Lösung keinen Nachtheil für die vollständige Vereinigung, sondern nur Vortheile nachrühmen. Wenn man von der Ueberzeugung des wesentlichen Einflusses der Antiseptik durchdrungen ist, wird man die Wahl der Operationsmethode (Anfrischungsfigur, Nahtmaterial, Nahtmethode) nur davon abhängen lassen, welches Verfahren am *bequemsten* ist, und welches am *schnellsten* zum Ziele führt. Gerade durch die Verlängerung der Operation wird die Möglichkeit der mangelhafteren Durchführung der Antiseptik gegeben. Erreicht man in einer Viertelstunde die Beendigung der Operation, so wird der Eindruck auf den Organismus weit geringer sein, als wenn man über eine Stunde mühsam operiren muss. In dieser Ueberzeugung, die sich mir, sowohl bei den Operationen des Meisters in der Gynäkologie, des verstorbenen *Karl Schröder*, sowie bei eigenen Erfahrungen gebildet hat, verzichte ich daher auf die sogenannte Glättung der Anfrischungsfigur, weil sie nur einen unnöthigen Zeitverlust darstellt. Hat man nach Umschneidung der Wunde und nach möglichst mit stumpfer Gewalt unter sparsamstem Gebrauch des Messers vollführter Abzerrung des Scheidenlappens die Schleimhaut überall vollständig entfernt, so folgt sofort die Naht.

Ich zweifle keinen Augenblick, dass mit jedem Nahtmateriale die besten Erfolge erzielt werden können. Die von *Simon* und *Hegar* empfohlenen tiefen und oberflächlichen Nähte in ihrem Wechsel sind früher das Ideal exakter Vereinigung der Tiefe und des Schleimhautrandes gewesen, und bei ihnen hat man Seide und Draht und "Silkwormgut" mit bestem Erfolge angewendet. Mühsam aber und nothwendiger Weise nur mit geschickter Anlegung der verschiedenen tiefen Suturen möglich, ist dieses Verfahren gewesen. Der Fortschritt, welcher durch *Werth's* Versenkung der Catgutnähte eintrat, ist ein vollständiger geworden, seit man, wenn ich nicht irre, unter dem Einfluss *Schröder's* die *fortlaufende Catgutnaht* anwandte. Die Schilderung des Gebrauches dieser Methode ist hier wohl überflüssig; sie ist übrigens auch mehrfach in neuester Zeit empfohlen worden. Kurz möchte ich aber doch betonen, dass man bei derselben in dem obersten Winkel der Anfrischung in der Scheide beginnt und nach dem Mastdarm oder Dammende der Anfrischung zu die Tiefe zuerst vereinigt, um über dieser tiefsten Lage noch zwei oder drei Etagen anzulegen, bis endlich die Schleimhaut fortlaufend vereinigt wird. Der schwierigste Punkt scheint mir bei den completen Mastdarmdammrissen die Vereinigung der Mastdarmschleimhaut zu sein; und ich habe schon an einer anderen Stelle hervorgehoben, dass man hierbei entschieden einer besonderen Geschicklichkeit bedarf, um den vollen Vortheil der Methode zu geniessen. Die Spitze der Anfrischung des Mastdarms wird zuerst vereinigt, das unterste Ende zuletzt. Jedes Mal wird die Nadel neben der Mastdarmschleimhaut in der angefrischten Fläche eingestossen und hart an dem Schleimhautrande ausgeführt, um an der entgegengesetzten Seite wieder genau an der Grenze von Schleimhaut und Wunde ein- und in der Anfrischungsfigur ausgestossen zu werden. Dies von *Schröder* zuerst empfohlene Verfahren, welches mit dem neuerdings von *Lauenstein* angegebenen eine gewisse Uebereinstimmung zeigt, sichert bei den Mastdarmdammrissen den Operateur vor der Einkrempelung der Mastdarmschleimhaut. Durch die Anwendung dieses Verfahrens ist man ferner im Stande, in überraschend kurzer Zeit die Vereinigung der angefrischten Fläche zu bewirken.

Wenn ich daher auch überzeugt bin, dass man mit je
Ziele kommen kann, so ist doch die Schnelligkeit der
rathe, auf die übrigen Nahtmaterialien und auf die
zichten und der fortlaufenden Naht mit einem gute
denn eine Versenkung und eine fortlaufende Naht i
möglich. Nur betone ich dabei auch die gute Bescha
an einer anderen Stelle meine Ansicht niederlege.

Wenn ich aus der Ueberzeugung, dass die Antisept
ders sicher gewahrt wird, den Verzicht auf die Glättun
brochene Naht Ihnen empfehle, so rathe ich ferner,
wie möglich zu wählen. Für die *Simon'sche* oder *Sims*
ich ziehe dieselbe dann vor, wenn der Mastdarm mit
Fällen von Erhöhung des Dammes wende ich gern die
es sehr ausgesprochen ist, dass die Columna rugarum p
Doch betone ich nochmals, dass ich auch mit den übr
ich sie versucht habe, gute Erfolge gesehen habe, und
gültig halte. Die Einfachheit der beiden Verfahre
veranlasst, zu ihnen zurückzukehren. Die Erfolge,
dammrissen gesehen habe, sind solche, dass ich wohl
gegen früher vollkommen umgedreht. Während hie
Fistelbildungen das Gewöhnliche waren, ist jetzt de
mässige. Nur ganz ausnahmsweise sieht man mang
Fehlern in der Antiseptik dann zuzuschreiben, w
erscheint, Fehlern in der Technik des Nähens dan
Fisteln zwischen Mastdarm und Scheide sich bilden.
ein Unterschied gegen früher vorhanden, als man s
wenn einmal entstanden, dauernde Fisteln sah; jetz
bares Kanälchen besteht, welches in den allermeisten

Auch beim *Vorfall* sind die Resultate sehr gute,
septik vollständig zu wahren. Oberflächliche Granula
Spitze des Lappens bei der *Bischoff'schen* Operation
Man hat jedes Mal das Resultat, welches nach Beend
Wesentlichen als das definitive Operationsresultat anz
vermieden ist.

Die Betonung der Nothwendigkeit, die plastisch
Genitalien zu bessern, und das Bestreben, diese zu mö
gestalten, scheint mir nicht nur deshalb geboten, w
wieder Arbeiten veröffentlicht werden, welche eine
verwerfen und dadurch diese Encheiresen überhaup
sondern auch deshalb, weil in jüngster Zeit gegen den
Uterus angerathen und ausgeführt worden ist.
Operationen und die Befolgung obiger Grundsätze wird
dahin führen, als Prolapsoperation nur die Colporra
Form der posterior hinzustellen. Ob man die Amput
piell, oder nur wenn sie selbst colossal verdickt ist, hi
discutabel. Die zuerst von *Karl Braun* hervorger
körpers, die der Amputation folgt, scheint mir nicht
abzugeben. Die Hypertrophie des Cervix uteri, wel
beobachtet, ist keine muskulöse, sondern nur eine bin
Beobachtung der Rückbildung der Muskulatur des
auf Stauung, zum Theil auf Zerrung beruhend, bild
rungsgemäss zurück, wenn die Patientin den Vorfall n

pation aber ist theoretisch nicht im Stande, den Vorfall zu heilen. Und die praktischen Erfolge, d. h. Misserfolge, welche von einigen Operateuren erzielt worden sind, beweisen direct, dass durch dieses radicale Verfahren, zu dem man in Folge seiner leichten Ausführbarkeit gewiss geneigt sein könnte, nichts weiter erreicht wird, als die Herstellung einer Enterocele vaginalis, welche nothwendiger Weise noch die Hinzufügung von Colporraphien verlangt.

Mein Resumé würde also dahin gehen, dass man bei den plastischen Operationen am Damm und an der Scheide selbstverständlich die Antiseptik auf das Penibelste wahrt, auf die Form der Anfrischungsfigur am wenigsten Werth zu legen hat, jede Methode, welche Verengerung der Scheide und Herstellung eines Dammdreieckes erreicht, als berechtigt anzusehen hat, dass man als überflüssig die sogenannte Glättung der Wunde aufgiebt und im Interesse der Schnelligkeit am besten thut, als Nahtmaterial Catgut und als Nahtmethode die etagenweise fortlaufende Naht anzuwenden, dass man endlich zur Heilung des Vorfalls die Entfernung des Uterus verwirft.

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# THE INTRA-UTERINE STEM AS AN EMMENAGOGUE.

## LA TIGE INTRA-UTÉRINE COMME EMMÉNAGOGUE.

## DAS INTRAUTERINPESSARIUM ALS EMMENAGOGUM.

BY DR. C. R. REED,

Middleport, Ohio.

It is not the purpose of this paper to discuss the rationality, the safety, or danger of the stem as a medical or surgical appliance. Its use has been denounced and condemned, under all circumstances, by gynæcologists high in authority, with a dogmatism and arrogance unworthy the discussion of any subject. Others equally famous as teachers and writers with ripe experience, and apparent candor, advocate its use as a safe and efficient means of treating many diseases or morbid conditions of the female pelvic organs. These pro and contra opinions have been declared in discussing the merits of the stem in the treatment of flexures and other distortions of the uterus, but would, a priori, apply to it in the treatment of amenorrhœa or deficient menstruation. Chief among those who denounce the stem as irrational and dangerous, is our distinguished countryman, Thomas Addis Emmet, and others; and of those who advocate its use, and have recently published their opinions, are Goodell, Mundè, A. Reeves Jackson, the late Dr. Fundenberg, etc. Goodell says he was led to condemn its use, but a riper experience has wholly changed his views with regard to its use, and that there are cases which can be satisfactorily treated in no other way. Mundè, in speaking of Thomas' galvanic stem in amenorrhœa, says: "I have had excellent results with it when I could secure its retention." Dr. A. Reeves Jackson, in a paper read before the Chicago Medical Society, June 7th, 1886, and published in the *Journal of the American Medical Association*, Vol. VI, page 703, closes with these words: "The use of the stem need not be dangerous, at least no more dangerous than any other effective method." "The conditions necessary for safety and success are watchfulness, patience and slow progress." The late Dr. George B. Fundenberg, in a paper read in the Section of Gynecology, at

the thirty-sixth meeting of the American Medical A
*Journal*, Vol. v, page 258, says: "That occasional tro
of the stem cannot be disputed; but when intelligent
ment will compare favorably with other methods, an
surgical operations." Across the sea we find many w
advocate its use, and among the latter, and a late writ
of gynæcology in the Royal University Clinic for W
Winckel, who, in his late work on "Diseases of Wo
305): "The patients observe that menstruation is acc
the intra-uterine stem is inserted; also, that the flow
they consequently feel greatly relieved. . . . Th
only facilitate the flow of the menstrual fluid, but
secretion, or, indeed, by causing slight hyperæmia of
der the secretion more fluid and more easily discharg
stem may be purely mechanical, or it may be an irrita
and thus bring about a more complete development
is a better soil than the diseased mucous membrane fo
"Again, the full development and discharge of the ov
congestion which is produced by the supporter."
choice of cases, the application of the intra-uterine st
but carelessness on the part of physician or patient
lengthened suffering." "Chrobak records a permane
single case, but very often observed improvement in
cure of the dysmenorrhœa, or amenorrhœa, or migrain
however, only as long as the supporter was worn."
Winckel, 1887.

While many gynæcologists have put on record their
stem in the treatment of flexions and as a cure for ster
views of the instrument as an emmenagogue. Wheth
mechanical, as emmenagogues, are known to medical
here to discuss, but will simply say that agents have
the cultivation of medical science, and will conti
menstrual flux when absent, and increase it when
gogues in medical works on materia medica and ther
fail to find there the intra-uterine stem. It is inciden
by Thomas, Munde, Goodell, Athill, Winckel, and pr
resort when others have failed, and is usually referre
the young practitioner from a trial of the instrume
irrational, dangerous and useless, and by another l
wonder to the student of gynæcology, and we will no
flicting opinions. That its presence in the uterine ca
promote the menstrual flow when absent and increase
beyond controversy, but whether this action or pr
emmenagogue will depend on the definition of the te
who oppose this use of the stem, to say that the flow
stem is a hemorrhage, the result of the irritation cau
true menstruation; if it is regular in recurrence and ans
flow, it is no matter what causes it. Our knowledg
tion, its causes and purposes in the animal economy,
declaring positive opinions on the subject, as dogmatis
scientific facts. Much has been written on vicarious
knowledge have we on the subject?

In the use of the stem in the treatment of flexures of the uterus, it was observed that the menstrual flow was often increased in quantity and prolonged in duration, so much so that the stem would have to be removed ere the flexion and stricture were cured, before the flow could be arrested. This observation led to the use of the stem as an emmenagogue. In the paper by A. Reeves Jackson, referred to in the early part of this paper, he states: "Hemorrhage.—This is a frequent consequence of the use of the stem. I have known a few cases in which it was produced almost immediately after the introduction of the instrument, and continued as long as the latter remained. In most instances, however, we need not expect more than a slight flow, lasting a few days, and perhaps an earlier appearance of the next menstrual epoch, with possibly an increased amount of discharge during the first two or three periods following the beginning of the treatment."

The stem has been used since the beginning of the present century for the treatment of flexions and strictures of the cervix, but not until the last two decades has it been used in the treatment of amenorrhœa. It was first brought to the notice of the profession as an emmenagogue by Prof. Thomas, of New York, in 1870; and in 1872 Dr. Lombe Athill, of Dublin, Ireland, whose book on "Diseases of Women" was published in this country in that year, recommended its use for the same purpose. The stem, as recommended by Thomas and Athill, was composed of alternate sections of copper and zinc or alternate beads of those metals, for the purpose of generating a supposed galvanic current, thereby stimulating the mucous membrane of the uterine cavity and indirectly causing the menstrual flux, "*Ubi stimulus, ibi fluxus.*" We usually commence the treatment with the elm tent, as large as can be readily inserted, and, if it causes no pain, it is allowed to remain until it breaks down and flows away as mucilage. To secure the retention of the elm tent the sides should be notched. We have frequently passed an elm tent until its lower end was grasped by and disappeared within the os and remained there for days or weeks, and while the os remains patulous we do not fear infection. This practice might seem to be dangerous, but we have had no accidents from such use of it. When we have had failure in retaining the galvanic stem, and the os and cervix have become patulous and the elm slips away, we resort to Chambers' split stem of vulcanite, with branches sufficiently divergent to be self-retaining. We have no fears that it will cause pain or undue irritation, if its use is preceded by the elm, and in no case where it has been used as an emmenagogue did we have to remove it because of any bad results. When we first began to use the stem we required the patient to remain quiet for two or three days until tolerance was established, but now, if she is free from pain, absolute rest is not enjoined; but should pain result, which is not removed by rest and an anodyne, the tent should be removed and after a few days reinserted. By this means tolerance will soon be acquired, and it will give no further trouble.

But it may be claimed by those who oppose the use of the stem that its effects are purely local, that the cause of the amenorrhœa still exists, and it will return when the local stimulus ceases to be used. The same objection may be made to all direct emmenagogues; they act locally when they act at all. The stem is not indicated when the amenorrhœa depends on some defect or disturbance of the general system; but when the cause is local, general treatment will not remove it, and, as was tersely said by a recent writer, "it is surprising that physicians will still continue to treat local diseases by general medication." Where local treatment will cure disease, it should be preferred to agents which act on the general system, often disturbing the healthy functions of important organs. While the stem is being used, any general treatment indicated by the condition of the system may be employed. The stem is specially indicated in those cases of amenorrhœa depending on an undeveloped or infantile uterus. In these cases the stem acts in conjunction with other agencies as a local stimulus, increasing the

growth of all the tissues of the uterus and its append
form their functions. Cases frequently occur in wl
though apparently free from disease, are torpid, and d
to the performance of the functions of menstruation.
to the uterus is needed; and this will be best applied
condition of torpor the uterus will tolerate almost an
cauterizing, and no danger need be apprehended from
that will irritate the mucous lining and arouse th
organ. In superinvolution, with scanty menstrua
excite a new growth of tissue, and may also be use
Within the past few years, several remarkable exa
have come under our observation. Some of these ha
children; others have been sterile, and some in the u

Miss D., aged seventeen, began menstrual life at
She was regular a few periods, then irregular for
ceased altogether. She was treated by a skillful prac
restoration of the menstrual function. I saw her N
the most marked example of chloro-anæmia that we
symptoms attending that condition. General treat
emmenagogues were continued until February 16th,
tion. On that day we dilated the cervix with the
patient, the uterus appearing almost insensible, and i
she wore several days, and on its coming away we ag
bers' stem, on February 25th. In a few days she m
period the stem came away; since that time she ha
months in the year; menstruates freely and regularly;
and is having good health.

Miss D., aged twenty-three, of healthy parentage
lar at fourteen and continued so to nineteen years of
she fell into the water. She was then "unwell," and
exchange her wet apparel for dry. Menstruation
painful; hystero-epilepsy developed; she menstruated
when we saw her, October 1st, 1886, she had not men
Nutrition was good; she was fleshy but melancholic,
occurred. On examination we found no atrophy of the
depth and there was apparent entire insensibility of th
extent of Palmer's large dilator, no pain was felt, an
Within a week she menstruated freely and for severa
discontinued and menstruation again became irregula
stem. Have had no report from her for some months

We might multiply cases, but they would only b
needlessly consume time. An objection always lies
the young unmarried female to a uterine examinatio
her health is breaking down, her mental faculties an
tered, and general treatment having failed, it may
institute the necessary examination and treatment, a
Emmet, we repeat it here, "When a young woman
rational to suppose that she should receive the prope
were older." It is more frequently in the young g
where there is a faulty or deficient development of th
and vascular stimulus to this organ and its appendag
intelligent use of the intra-uterine stem, we may

impressed on his classes by the elder Meigs, when he said: "*Obsta Prin-cip-i-is*; Oppose the very beginning of disease."

DISCUSSION.

Dr. J. P. MILLER, Buckhannon, W. Va., said:—For me it may be well, in attempting to discuss the use of the intra-uterine stem, to say that I am merely a rural practitioner, and to such, if they be here, I wish mainly to address myself.

We usually find ourselves hampered, when contemplating anything modern in gynæcology or surgery, for want of instruments and appliances sufficient, but in dilating the cervix and applying the intra-uterine stem this apology does not obtain. I have for some years used the intra-uterine stem, and recently the large steel dilators for rapid dilatation. I now do this mostly for obstinate dysmenorrhœa in the virgin, when, after vainly trying other treatment, I examine and find flexion, stenosis, or, as is usual, both. These conditions in the married are usually accompanied with sterility, with constantly increasing severity in symptoms to extent of violent hysteria-hystero-epilepsy, and even insanity.

For dysmenorrhœa, especially the more moderate, I first try medical therapeusis. My favorites are gelsemium, cimicifuga, viburnum, either or all combined. These I never find useful where the use of morphia has already been made a habit. Some of those patients I found had been using morphia five, ten, even fifteen years. These are cases for whom you will find it necessary to do something more than medication, and that at once.

I have been startled at the rapid and remarkable success following thorough dilatation and use of intra-uterine stem in some of my cases. But this, as all good things with us mortals, has its lack of complete goodness. We who have tried, know the trouble in retaining the stem. I have tried almost every kind of device, and now seldom bother with anything but Chambers' split spring stem; and I have had cases where the strongest of these was too weak to resist the constant expulsive action of the uterus, finding it necessary to introduce a new stem every fortnight, or even oftener. But let the difficulties and perplexities which face us be what they may, it is clearly and certainly our duty to do something, and everything, to relieve these phenomenal sufferers. They will usually tell you their condition is indescribable. They vary through all the pitiable shades of slight periodical mental angularity, ungovernable hysteria, chorea, hystero-epilepsy, and I have seen them thoroughly and symmetrically insane.

I now recall a case, a young lady, who would steal away from home and conceal herself in the woods. The family and neighbors had repeated difficulty in finding her, and when they did so she always begged to be left alone there, to die. She had been for years an invalid. No organ in her body appeared to functionate properly. She was anæmic, weak, and for the most part helpless, and all her forebodings thick night of gloom. Rapid dilatation to full extent of Bear's or Goodell's larger instrument (I do not remember which of these I used) changed this girl's every condition, physically and mentally. She did not long use the stem. I did this about two years ago, and incidentally saw my patient a few weeks since, when she told me that two months after the dilatation she suffered none of the former symptoms. A greater change in appearance I have never seen in any one.

Another patient, as an offset to this, I may cite, a married woman, and sterile, with hystero-epilepsy—the phenomenon of distortion of hip, knee and foot. Had stenosis and flexion. I had great trouble in dilating. She was the most hyperæsthetic patient I ever had. I generally give a hypodermic injection three-eighths to one-half grain morphia with atropia, and nothing else. To this patient I gave three-

fourths grains morphia, and then the A. C. E. mixtu
and yet I could not get her to tolerate dilatation to
instrument. Here I have the greatest trouble in rete
without the stem three or four months old symptom
not submit to re-dilatation. I have named my worst
are the grades between

What I wish again to emphasize, and it was of th
is that the common practitioner should make this pa
land everywhere is full of these sufferers. Many of
specialists, and could not go if we told them.

There is nothing complicated about this operation
pure in certain formulated solutions form any part of
of pelvic peritonitis, of which we read so much, a ne
A thorough douche and washing of the vulvo-vaginal
dose of morphia just before dilating, and placing inst
and uterus in boiling hot water for about ten minute
stitutes the antisepticus and prophylaxis that I pract
call it an operation—and I have seen no untoward re
quiet and in the dorsal position for forty-eight to sev

Dr. E. E. MONTGOMERY, Philadelphia, said t
pessaries, in general, would be incomplete without t
the late Dr. A. H. Smith. He had been in the hab
purpose mentioned by Dr. R. He also used this pe
volution of the uterus. In the early use of these pe
nate rings of copper and zinc, and the benefit was at
generated, but I am inclined to attribute it to the
not to the homœopathic amount of electricity thus g

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The Secretary read for the author, Dr. THOS. M
a paper—

## ON SOME POINTS IN THE PATHOLOG
## LACERATIONS OF THE CER

### QUELQUES POINTS DANS LA PATHOLOGIE ET LE
### TIONS DU COL DE L'UTÉ

### EINIGE PUNKTE IN DER PATHOLOGIE UND BEHANI

Elsewhere, and more especially in America, the pa
tions of the cervix uteri have received an amount of co
exaggerated were this to be merely measured by the
accorded to this subject by British gynæcologists. Th
paper on "Tracheloraphy" before the Dublin Obste
that operation, or the circumstances under which it w
previously alluded to in the "Transactions" of the ol
tion, and to the present day this topic receives far less
it is entitled to.

Moreover, although Dr. Emmet, in the last edition of his classic work on "Gynæcology," has very kindly referred to my views on the frequency and importance of obstetric complications arising from cervical laceration, still, neither this point nor the advantages which I believe are obtainable from amputation of the mutilated and hypertrophied cervix over tracheloraphy, in certain cases of stellar and extensive bilateral laceration, are, I think, sufficiently recognized, either by British or by American practitioners.

It is obvious, however, that the prevalence of these injuries can in nowise be affected by any racial or climatic differences on the opposite shores of the Atlantic, while, as regards their remedial treatment, any method found effectual in New York or Boston should, *cæteris paribus*, have similar results in London or Dublin. Hence, I now venture to re-submit the result of my clinical observation on these and other points connected with this subject to the better judgment of my American brethren, to whom we who practice within the narrower limits of older countries are so largely indebted for the recent progress of our art.

In the present communication I shall, therefore, in the first place, refer to the increasing frequency of cervical lacerations in recent gynæcological practice, and to the causes assignable for this. Secondly, I shall point out the parturient and puerperal troubles consequent on these lesions. Lastly, I shall briefly recapitulate my clinical experience of the treatment of this accident, and more particularly in reference to the utility of amputations of the cervix in cases of extensive bilateral and stellar lacerations. The latter, when met with in a state of chronic areolar hypertrophic disease, cannot, I believe, be effectually remedied by tracheloraphy, and if uncured may result in lifelong misery, even when not eventuating in cancer of the cervix. Such cases, I contend, require, and may generally be successfully treated by, the amputation of the mutilated and diseased cervix uteri.

With regard to the frequency and pathological importance of cervical lacerations generally, my views are entirely in accord with those of Dr. Emmet—namely, that their importance cannot be exaggerated, inasmuch as nearly half the ailments met with in gynæcological practice among those who have borne children are to be attributed to lacerations of the cervix.

Cervical lacerations are unquestionably now more commonly met with than was the case in my earlier experience, some ten or twelve years ago. This fact is probably ascribable to the larger proportion of assisted deliveries in recent midwifery practice, and, above all, to the employment of the unnecessarily powerful axis-traction forceps now resorted to in many cases prematurely, or before the sufficient natural dilatation of the os uteri. Be the cause what it may, however, of the increasing frequency of cervical lacerations, as observed in recent gynæcological practice, there can be no question. Thus, in my hospital, I have, of late years, noticed that the majority of child-bearing patients who present themselves for uterine examination are found to have sustained some degree of cervical laceration, varying from a mere fissuring of the os to the most extensive stellate laceration of the cervix. Even the former must be regarded as a condition of some importance; while the latter lesion is of still greater consequence in its secondary results; its reparative treatment being often followed by the complete subsidence of chronic pelvic complaints, formerly misinterpreted and ascribed to other morbid conditions or displacements of the uterus.

Before referring to the secondary consequences of cervical lacerations, we may allude to the primary or more immediate effect of these accidents.

The effect on subsequent delivery of cicatrices resulting from cervical lacerations is a matter of practical obstetric interest, these being a more frequent cause of tedious labors than is commonly supposed. In my own practice, I have, on several occasions, in instances of rigidity of the os thus produced, been obliged to incise the os before

delivery would be accomplished, and at the present t
uterine occlusion, due to this cause, under treatment in

In this connection it may, perhaps, be of some in
until recently completely ignored by successive genera
the frequency of cervical lacerations, as well as their eff
quent parturition, from rigidity of the os uteri, may be
writers so far back as the middle of the seventeenth ce
by Mauriceau, in his "Maladies des Femmes Grosses,"
Chamberlen, who, in his translation of Mauriceau's w
"unnatural deliveries from a strong cicatrice, which ca
preceding ulcer or a rupture of a former bad labor—
rated with a fit instrument, lest another laceration hap
the woman in a worse condition than before."* And a c
"Cases in Midwifery," "lacerations of the cervix u
the cause of rigidity of the os, and, consequently, p
patients."*

Cervical laceration is an occasional starting point of
upper portion of the vesico-vaginal septum, and m
fistulæ, and in almost every instance of this kind that
the cervical laceration and the extension to the vesic
instrumental delivery.

Laceration of the cervix uteri, whether from the pre
first stage of labor, or from precipitate natural delivery
siderable obstetric interest as one of the causes of floo
attention to cases of *post-partum* hemorrhage thus occasi
with many instances. And I may here repeat that "t
when the practice recently advocated, of applying the f
tion of the os uteri, becomes generally adopted, as seen
midwifery practitioners will thenceforth have an ample
accident than was the case in the practice of their poss
predecessors in the obstetric art." For although some
tion of labor, rather than the method of delivery, is the
fissurings of the os and cervix, it seems quite evident t
tion, however rapid, can be so liable to occasion ruptur
and cervix as its forcible manual extension, in efforts t
or the forceps. Some years ago, I brought before the
ral cases, in which I had been called in consultation, w
torn through by the abuse of the double-curved midwif
have I seen from version, where the hand was forced
uterine cavity before the full dilatation of the os, and
similar consequences had followed undue manual violen
placenta. In many cases of this kind I have traced h
source in the injured vessels of an extensively lacerated
of hemorrhage was described by Gooch, although he fai
which was then of far less frequent occurrence than a
natural delivery was the general rule, and accoucheurs
patient reliance on Nature's powers, in cases of unobst

* "The Diseases of Women with Child and in Childbed."
and enlarged by Hugh Chamberlen, M.D. p. 197. London:

* "Cases in Midwifery." By William Smellie, M.D. Vo

should ever be replaced by hasty operative interference and unjustifiably violent mechanical force.

The special liability to cervical injuries under these circumstances is self-evident, and their physical evidences are obvious to the veriest tyro who has the opportunity of contrasting the tapering, nipple-shaped neck of the sterile uterus, slightly projecting into the vagina, its apex intersected by a small transverse dimple, or marked by a minute circular depression, the os externum, with the hypertrophied, truncated, fissured, or lacerated cervix. In the latter we find the results of the lesion in question in the irregularly gaping mouth, semi-concealed by a glairy, or muco-purulent discharge, through which the everted endo-cervical mucous membrane may be seen extruding, in so many of our child-bearing patients, and which too often is the result of the injudicious use of the needlessly powerful axis-traction forceps now in vogue.

In a medico-legal aspect, and especially as a proof of previous delivery, cervical laceration is, therefore, of unquestionable importance, since by no other circumstances can the evidences of this injury be produced. On the other hand, the non-existence of such cicatrices or fissures is no proof of non-delivery, as the fissuring may have been so slight as to heal within the puerperal period, leaving no obvious traces of the injury.

The connection between laceration of the cervix uteri and many of the chronic disorders of women formerly exclusively ascribed to idiopathic subacute inflammation of the uterus, and especially to congestion or ulceration of the cervix, has been clearly established. In such cases the lining mucous membrane is forced down through the gaping edges of the rent as soon as the patient rises from the lying-in bed, giving rise to cervical ectropium. This extruded membrane is a focus of irritation, spreading upward and causing endo-cervicitis, the edges of the rent becoming the seat of erosion, or chronic follicular ulceration, the hardened cicatricial tissue around the rent, after some time, assuming a distinctive character, and becoming a veritable neoplasm. A more immediate result of bilateral cervical ulceration is subinvolution of the uterus, which, as well as pelvic cellulitis, may in many, if not in most cases, be ascribed to this cause. In the first instance the inflammation extending from a cervical wound to the body and fundus uteri effectually arrests the natural process of involution. In the latter it spreads along the ligaments, giving rise to parametritis and salpingitis, or even reaches the ovaries, thus causing ovaritis.

As a cause of uterine flexions and displacements cervical lacerations are of considerable pathological interest, for if the resulting cellulitis so affects either of the suspensory ligaments as to cause thickening and shortening, the uterus will thereby be thrown out of its normal position, and a constant strain and sense of wearing, pelvic pain must be occasioned. These symptoms can only be relieved by relaxing the tension, either by restoring the inflamed ligament to its normal condition, which is next to impossible, or, more easily by taking off the dragging uterine weight by a properly adjusted pessary. Hence, the benefit experienced from mechanical support in many cases of chronic pelvic pain, which is more often consequent on cervical laceration than from any primary displacement of the uterus.

In the majority of instances of cervical laceration the direction of the fissure is antero-posterior, and it may extend through both walls of the cervix, or, as is more commonly the case, be limited to its anterior aspect. When thus situated these fissures, if superficial, often occasion very little trouble. In many such cases they become healed without any special care during the period of convalescence after delivery. But when from the abuse of instruments, or manual dilatation of the os, to expedite delivery, or for the removal of a retained placenta, or from the unusual size of the child, or any other circumstance, the cervix is extensively lacerated, either bilaterally or split into a number of sections by multiple or stellar laceration, then the results of the accident obviously become far more serious, leading, as they must, to one or other of the

pathological conditions just described. Under these c
treatment, viz., either tracheloraphy, or else amputati
sary. The value of the former and the procedure by
are so familiar to the audience I have now the honor o
to this operation would here be more than superfluous.
to call attention to the fact, on which I have elsewhe
raphy is by no means invariably applicable in cases of
failing even under apparently favorable circumstances,
may best treat the long train of symptoms consequent
tion of the lacerated cervix.

This view is not in accordance with Dr. Emmet's c
more fully recognize Dr. Emmet's authority on this
peculiarly his own, yet I cannot agree with him that a
for malignant disease, is necessarily malpractice. T
uterus for so-called hypertrophy or for abnormal elong
Emmet, who, moreover, is equally opposed to the app
tics to heal a so-called ulceration on surfaces that may
tion. "If," in Dr. Emmet's words, "this so-call
cervix should prove to be merely a laceration, the
together and united so that the integrity of the parts w
dent had never occurred, then to resort to amputation
tion is self-evident. But in that little *if* lies the entire
tracheloraphy, and successful as I have found it in app
in certain cases of extensive stellate lacerations of long
of substance, and accompanied with chronic inflamm
structures, or cellulitis, as well as with hypertrophy or
vix, caused by inflammatory exudations, tracheloraphy
such a case we can only benefit an otherwise incurabl
the mutilated and diseased cervix. Moreover, this ope
ence, is fully justifiable in certain cases of non-trau
parenchymatous cervicitis, especially in patients who
malignant disease, as well as in some instances of c
possible curative measure in its earliest stages, or to rel
life, in the latter stage of the same disease. Finally, a
laceration in which I have removed the cervix, the pati
since then, on the other hand there can be no doubt th
called for in some cases of sterility resulting from the
nation offered by a greatly hypertrophied, elongated, a

Within the last five years I have, for the foregoing r
a considerable number of cases, and I may observe—an
who assisted in nearly all my earlier cases, both in th
tice, confirms the statement, that, so far, at least, we ha
trous consequences which some writers ascribe to th
also add that in rather more than half of these cases th
was thus ablated have not since borne children.

# UTERO-OVARIAN INSANITY.

## FOLIE UTÉRO-OVARIENNE.

## DER UTERO-OVARIALWAHNSINN.

BY J. B. W. NOWLIN, M. D.,
Nashville, Tenn.

We propose to-day to call your attention to a form of insanity which, for want of a better name, we shall call utero-ovarian, or that form of the disease which we assume originates from lesions or displacements of the uterus or its appendages.

In the works of systematic writers upon insanity, there is a strange want of mention of the uterus or its appendages as causes for this disease. I am satisfied that it is of frequent occurrence, and that thousands of women are now languishing in private practice and asylums in whom, were the primal lesion removed, the insanity would vanish.

For years I have been an active practitioner of gynæcology, and my experience bears me out in the assertion, as well as that of many of my professional friends whose attention I have called to the subject.

Insanity is the outcome of many causes, some apparently of the most trivial character, and especially is this the case when influenced by heredity.

The nervous constitutions of all persons differ. That peculiar nervous idiosyncracy which will precipitate neuralgia, epilepsy, chorea, etc., in one person, will be wholly wanting in another. Insanity, in its protean manifestations, to say the least, is so confined to the nebulous domain of psychology that the utmost care and circumspection is demanded in its differential diagnosis. That insanity, in a large majority of cases, is precipitated by an æsthenic functional derangement is undeniable, and of these symptomatic forms of the disease we propose to treat. So intimate are the nervous activities or connections between the different organs of the body, that the nerve cells of one may take on functional derangements because of lesions in another, else we could not account for the thousands of cases of insanity resulting from diseases, both acute and chronic, which recover when the original disease has passed away. We often find that maniacal symptoms supervene upon the decline of the exanthemata, which soon passes away when the normal activities of the nerve cells have been restored.

Therefore, we assume that mania is generally the result of an æsthenic functional inactivity of the nerve cells themselves, and that any cause which impairs the functional activity of any organ may, by intimate nervous connections, derange that of another, and that the brain, as the central organ of nerve force, is particularly liable to involvement is not to be wondered at.

M. Morel, in his classification of insanity, designates his fifth group as sympathetic, and includes in it all the cases in which the primary lesion is not located in the brain but in some other organ, the brain being secondarily involved and sympathetically affected. His third group consists of insanity caused by the transformation of other neuroses, and includes hysterical, epileptic and hypochondriacal insanity, etc.

Blandford, in his work upon insanity, says: "When we speak of anæmia causing insanity, the term is understood to comprise all those conditions of bodily weakness which render a man, in the common acceptation of the term, anæmic. A woman may become anæmic from frequent hemorrhages. Depression is the first result, and insanity not unfrequently the outcome."

There is a group of patients whom Dr. S. Key characterizes under the head of climacteric, which comprises the insanity of pregnancy, lactation and child-bearing, also that of puberty and the menopause; and how often have practitioners seen cases of

insanity exist at these periods. The insanity of the me
by ill health or imaginary worry, or may have been c
quently accompanying this climacteric period; or its o
of advancing age, upon which is superimposed the ter
of menstruation. Whether it assumes the form of me
effects are marked upon cerebration. It is charact
energy or a tendency to mental paralysis or depres
period of excess of (energizing) power at its close. It i
diseases should assume the highest type of their activ
know that such diseases as hystéria, epilepsy, chorea,
intensification during the period of menstruation, pr
often suspension of the social instincts and perversi
drinks. These may be considered as the portals of in

Clouston says: "That the regular and normal perf
of the uterus and ovaries are of the highest importanc
female. Disturbed menstruation is a constant menace
women of unbalanced nervous constitution. Even nor
in some by disturbed nerves to no inconsiderable degr
eases is usually coincident with the menstrual period,
periods of exacerbation at such times. Insanity is
menstrual functions as a secondary result, or it is son
the primal lesion."

The intimate nervous connection between the uteru
case apparent. This is evident from the fact that w
insanity all the symptoms of that disease are intensifi
often become maniacal during the period of the catam

That cases of anæmia are often precipitated into i
be no question, and a large majority of such cases ar
cholic. Certain conditions, however, most generally l
as anæmia, heredity, etc. Should the blood be in
exist, and the woman's nervous system usually wel
may pass off without much disturbance of the norm
young women is probably a more frequent result of su
mania. Full-blooded women, through chill or shock
mania. Such is, however, rarely the case, and always
ment of the functions. In chorea or convulsions, the n
and not the motor centres, it not unusually happens th
is transferred from motor centres to mind centres, es
toms. Thus a neuralgia may suddenly change into m

Clouston, speaking of metastatic insanity, says: "
essentially a metastatic insanity, the diseased process
and attacking the nerve centres." He cites exampl
ulcer, the metastasis of erysipelas and syphilitic psorias
In these instances the organic diseases are probably pri
of functional activity in the nerve cells of the mental

Maudsley says: "To the argument that madness i
causes, which must be admitted, it is sufficient to repl
stimulation of any organ does not naturally produce p
this respect, therefore, the brain only obeys a genera
secondly, that it is possible to produce experimenta
mental derangements exactly similar to those w
causes."

There is not an organ in the body which is not in intimate relation with the brain by means of its paths of nervous connection. There seems to be a constant special correspondence between the different organs and the brain, through the medium of their internuncial fibres. This is not so manifest when the organs are in a condition of health, but so soon as disease supervenes, becomes most manifest. This is not only the case with the brain, but a most intimate relationship and sympathy exists between the organs themselves, as, witness the derangement of the stomach in pregnancy. It is not strange, then, that utero-ovarian diseases should establish a most intimate relationship with the brain.

Maudsley declares that so close is the physiological sympathy of the parts in the common health of the body that it is necessary, in the physiological study of mind, to regard it a function of the whole organism, as, seeing that insanity is often the result of utero-ovarian disease, displacements or perversion of functions, we believe it to be as reasonable an hypothesis as that hysteria should most usually have its seat in the brain, due to undue excitation of the genital system. Hysterical insanity is most usually met with at about the age of puberty, when the functional activity of the organs are at their greatest intensity, and the perversions of healthy functions most manifest. Coulson says that the volition or the feelings or the morals are always affected along with the purely bodily symptoms. Coulson, in his work on mental diseases, referring to the insanity of puberty and adolescence, says: "The risk to the mental functions of the brain from the exhausting call of menstruation, maternity and lactation, from the nervous reflex action of ovulation, conception and maternity, is ruinous, if there is the slightest original predisposition to derangement, and the unusually profound influence on all the brain functions at the great eras of puberty and the menopause, as these epochs are apt to upset the brain's stability."

Puberty has been said to be the first most dangerous period in the lives of both sexes, as regards insanity, but statistics prove that adolescence, when the generative function of reproduction is fully established, when the nutritious power of the brain is not so great in the recuperative efforts, is really the period of danger. Epilepsy and chorea occurring at this time of life show that the motor centres are more unstable and easier upset at this time than either the mental or sensory.

Between the ages of eighteen and twenty-five may be said to be the period of adolescence, when the nervous activities of reproduction have attained their maximum intensity, and this is one period of great danger, when hysteria, migraine and reflex nervousness arise. This period has been proven to be much more dangerous to the female than to the male; due, probably, to the more complicated changes taking place in their generative apparatus and the peculiar nervous constitution of the sex.

As showing what an important factor sexual influences may be in the production of insanity, Coulson says: "Post-connubial or the mental excitement of marriage culminating in an excess of sexual excitement, is apt to upset the convolutive stability in some persons predisposed to mental disease."

Demonstrating the influence of the genital apparatus upon the mental faculties, the insanity of pregnancy may be mentioned. Clemens mentions a case in which the woman became five times pregnant and as often insane; another who had six attacks of insanity, two due to pregnancy, two due to puerperal convulsions, and two to lactation. The same author states that a vast number of women are mentally unsound during pregnancy, and that very few pass the conventional line that divides sanity from insanity.

Nearly allied to utero-ovarian insanity, is that of lactation. It has been ascribed as due to the disturbances of the puerperal period, aggravated by the reflex activities of the brain, through the physiological act of suckling, and the exhaustion of long-continued maternity.

Not only are pregnancy and lactation common cau the cause of a species of insanity, known as puerpera succeeding delivery. It has been said that five per ce ring among women have a puerperal origin. Coulsen follows: "The great physiological cataclysm itself; tl mentally and bodily; the exhaustion by the loss of themselves liable to absorb every particle of septic m stream of energy from the womb to the mammæ. bined, upon an unstable brain, rendered so by heredit

In addition to these statements of Coulsen, I w laceration of the cervix and perineum are fruitful sou of that occurring more remotely.

In a majority of the cases of symptomatic insan important factor, and anæmia and perturbed action of nervous excitability common to all true womanhood the nearer approach to the masculine type the less lia the more effeminate the men the more liable. Fortu are due to impressions derived from the genital tract, the effect usually ceasing when the cause has been re

We have endeavored to prove in this paper tha insanity are due to utero-ovarian troubles. These ma perversion of function. Childbearing is one of the g To carry out this process requires the expenditure o and functional activity. The organs of generation ce nection with the mind centres, and everything dest one will impair the functional activity of the other.

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# AN ATTEMPT TO SECURE A STERILIZED THE WOUND AND ENTERING T CAVITY IN LAPARO

## UNE TENTATIVE DE SE PROCURER UN AIR STE PLAIE ET ENTRER DANS LA CAVITÉ PÉRITO

## EIN VERSUCH ZUR SICHERUNG EINER STERILISIRTEN WUNDE UND DEN EINTRITT IN DIE BAUCHHÖH

BY DAVID PRINCE, M.

Jacksonville, Ill.

The extent of the absorbing surface of the perit subject it to those antiseptic irrigations which are foun It is supposed that a wound made in the amputati from the injurious contact of atmospheric dust by irri bolic acid diminishes the tendency of germs to develo the mucous membranes constitute a barrier to the ent as a poison when it gains access to the living solids a pheric agents are capable of entering by the lungs, wit and the presence or absence of these agents in the ai

fever), constitute an important element in the question of the healthfulness of a dwelling place. Other agents, like the contagium of erysipelas, may localize themselves in a habitation, so that the danger of infection continues a long time after the apparent cause has been removed.

Until within a few years, and before the observations with which the name of Joseph Lister is indissolubly associated, the infection inhering in the atmosphere of hospitals was a mystery. It eluded observation and investigation. It defied every attempt at removal by cleansing and the replacing of wall paper and plastering; in short, everything except the complete destruction of the building itself. The difficulty in keeping hospitals free from infection, led many to the conviction that they should always be built with reference to their being torn down after a temporary use. We now know that the preventive of such inhering infection in a building is the avoidance of the first case of disease, or such management of it by antiseptic agents, as will limit the production of the contagium to the smallest possible quantity, and neutralize that which is unavoidably produced. By antiseptics and ventilation, the problem as to house infection has been pretty well worked out.

The problem attempted to be solved in this paper is, to secure in an apartment, for any convenient length of time, an atmosphere more pure than the out-door air, so that a room, or any number of them, may continue, as long as the machinery is in operation, to contain an atmosphere as pure as that of a mountain top.

With the working out of this problem, it becomes practicable to open the abdomen or other parts, and to keep it open an hour or more, and on closing it, to have it in such condition, as to material floating in the air, as it would be in if all the proceedings had been carried on subcutaneously.

The evidence is complete, that erysipelas and some other septic infections, are capable of being propagated by the products of a previous disease of the same kind.

The experimental evidence by inoculation may be illustrated by a quotation.

In the "Monograph on Microörganisms and Disease," by Dr. E. Klein, p. 48 (McMillan & Co., 1884), Orth is quoted as having cultivated artificially the micrococci of erysipelas, and afterward reproduced the disease in rabbits by inoculation. Fehleisen found the micrococci only in the lymphatics of the affected parts, and those he cultivated artificially for fourteen generations (which it took two months to do) on peptonized meat extract, gelatine, and solid serum. The micrococci form a whitish film on the top of the nourishing material, and when inoculated into the ears of rabbits, a characteristic erysipelatous rash makes its appearance after from thirty-six to forty-eight hours, and spreads to the roots of the ears and further on to the head and neck. The animals do not, however, die from it. In the human subject, he produced typical erysipelas after inoculation with the pure cultured micrococcus in from fifteen to sixty hours. These inoculations were made for the purpose of curing certain tumors, one of lupus, one of cancer, and one of sarcoma. Fehleisen also in several instances carried out a second inoculation successfully, within a few months. He found that a three per cent. solution of carbolic acid, and a one per cent. solution of mercuric bichloride destroyed the vitality of these micrococci.

That the material is also capable of being transmitted through the air, and of fixing itself upon wounds or abraded places, is proved by the strongest possible circumstantial evidence. This being admitted, the problem of prevention resolves itself into that of *exclusion* of the matter from contact with the susceptible part, or destroying it between the moment of contact and the time of its development into disease.

The spray of carbolic acid as devised by Lister, acts probably not by destroying the septic microbes, nor by excluding them, but by rendering the conditions unfavorable for their development. The spray prevents the drying of the exposed wound surfaces; prevents the incipient changes which precede apparent decomposition, at the same time

that the germs themselves are deprived of the surrou
development. In the meantime, the germs are destroy
before they have developed the conditions of attack.
acid, or of mercuric bichloride, acts in the same way t
activity of such germs as may fall upon an exposed su

While this may be said of ordinary septic germs, i
germs, like those of erysipelas, can be neutralized by t
if they are once implanted upon the surface of the livi

These methods are liable to failure in cases of wou
it is difficult or impossible to secure an adequate app
sufficient intensity and duration to destroy the invadi
been made, however, the chemical or the germicide ag
relied upon to prevent the natural consequences. The
tion of carbolic acid (one per cent. solution) has been
the development of erysipelas, and of putrefactive cha
healing of wounds.

The perpetual bath, antiseptically medicated, is ap
arms, and by lying in the water, it is applicable to th
part of the neck and the head. Some very satisfactor
this method of management.

It must be admitted, however, that many wounds
application of this or of any other agent capable of
natural development is that of erysipelas or of putrefa
of joints and of the peritoneal and the pleural cavities
taining the aqueous humor. The agents of infection
is at great disadvantage in the treatment of the case.

Much may be done by drainage and the introduct
is necessary that they shall be of feeble force, in orde
faces or not to poison the general system by absorpti
they are applied. It follows, from these considerati
fecting agents should be the least favored method,
vention by exclusion is impossible or has been neglect

The *exclusion* is of two kinds: the immediate and
1st. The exclusion of those agents from the air which
of an operation, by means capable of purifying the wh
or the portion of it which surrounds the wound in th
The permanent exclusion of an infected atmosphere b

This implies that while the atmosphere of a whole
the time in which an operation may be performed, it
expensive to secure a perpetual purification of the ap
during his recovery. It is implied that the exposed w
secluded from contamination by such a character of t
that the infection will be arrested or destroyed.

We have our subject classified by the nature of thi

1. Antiseptic applications during the progress of c

2. The arrest of the access of infection during the
of the dressing first applied and allowed to remain.

3. The purification temporarily of the air of an aps
tion may be performed.

1st. The plan of the first method is that of a perpetu

2d. The second plan is that of a dressing impervio
air, and it includes the "Lister dressing."

It is found that it is of no advantage to have the dressing air tight or water tight, but that a material with fine meshes, like that of cotton, will answer the purpose. If the wound is exposed under a spray or douche, and aseptic cotton, wool, or other similar material be applied and retained, the agents of septic changes cannot enter as long as the material of the dressing is entirely dry. It is, therefore, convenient to have the cotton or other substance previously treated with a solution of mercuric bichloride or other antiseptic, the water being dried out before the use of the material for dressing. Otherwise the dressing, infiltrated with the exudations from the wound, becomes putrid, requiring its removal sooner than is necessary with a dressing capable of preserving from putrefaction any fluids that may get into it.

In applications of gypsum it is convenient to wet it with a solution of $HgCl_2$.

3d. The plan of the third class is that of securing the freedom of a whole apartment from floating minute particulate material of all kinds during the time necessary for the performance of a surgical operation, or the exclusion of air dust from the portion of air surrounding a wound and entering into it.

It is exceedingly probable that if the cavity of the peritoneum or any other closed cavity can be opened in an atmosphere free from floating material, and closed again after a short period, the conditions will be the same as though the work of removing a tumor, or other operation, had been done subcutaneously, so as to exclude the contact of air.

The continued purity of animal and vegetable liquids sterilized and placed in vessels closed by sterilized cotton, admitting free access of gases but sifting out particulate material, affords the strongest probability to the assumption that the septic changes occurring in wounds and in closed cavities into which air has entered, would not occur, if the air were free from such material as might be filtered out by passing through cotton or other material having fine meshes. Reasoning from the general facts here referred to, in relation to animal and vegetable fluids secluded from the floating material of the air, it becomes in the highest degree probable that the material of wounds would be equally exempt from change, if exempt from the contact of this floating material, and that if thus secluded, putrefactive changes would not occur. Wounds and injuries which are subcutaneous, show an exemption from septic changes, though a great amount of vascular and nervous disturbance may arise from the injury.

The use of douches and irrigations is not for the purpose of purifying the air, but for washing away these minute particles, or rendering them inert by some influence upon them, thus rendering them less able to germinate, or, for the purpose of affecting the living surfaces, increasing their capability of resistance.

I visited several cities of Europe in the summer of 1884, and had it in mind to observe what provisions were made toward the end of exemption from septic changes incident to surgical operations. I saw several new rooms with non-absorbable floors, walls and ceilings, yet having doors opening into the halls of hospitals. There were provisions for non-absorption of anything floating in the air of the apartment, but no provision for purifying the air.

At Hamburg, in connection with the female department of the general hospital, was a room just completed, having four outside walls, so that it was necessary to go through six feet of open air, to get from the hospital into it. There was evidence of great pains to secure the greatest possible degree of cleanliness, but there was no provision for a better air than the outside atmosphere of a large city. I came home resolved to do something better than the latest improvement in Hamburg.

The apparatus to be described is the result of my reflections upon the subject, and experience has suggested so many modifications that new cuts have been necessary in order to illustrate the history of the development of the idea, and the adaptations for hot and cold weather.

For hot weather, the current of air cannot be se operating room above, or in the room below, but connected with a chimney operating as a *vis a fron* hospital having a chimney which is in use in sumn a *vis a tergo*, blowing air into the basement, which the operating room.

Taking a hint from the observations recently made weather upon the number of microbes floating in the whether or not it is practicable to subject the air ent influence of artificial showers, in order to precipitate to part of these enemies to surgery.

They are known to be heavier than the air, because air within a tight box which has been several months of rest is of no use to us, for the purification of the a means is impracticable. The commotion of the air inc dislodge the minute particles from the floors and wall the air, besides permitting the entrance of common air

The dry filtration by means of cotton or other subst particulate material floating in the air, was not thoug rapidity necessary in the entrance and exit of the air entering from without during the progress of an ope from the occupants of the room. If, however, we can to pass through several showers of water, we have an these objects and carry them to the ground.

This paper contains five illustrations of the progres

The following cut illustrates the first development

This cut (Fig 1) was first published in the St. Louis February, 1885 ; afterward in the *American Practitioner the American Surgical Association*, and in the *Quarterly* 2 shows some modification in the detail of the same pl

The third figure illustrates the advancement of the

The next advance in the conception of the subject tion of the general air of the operating room, and envelop a wound in the progress of its formation.

In the device for an additional and separate sup difficulty arose in the conception of the means of get effectually displace the other air of the room, and wound. It seemed that for hot weather the force of a

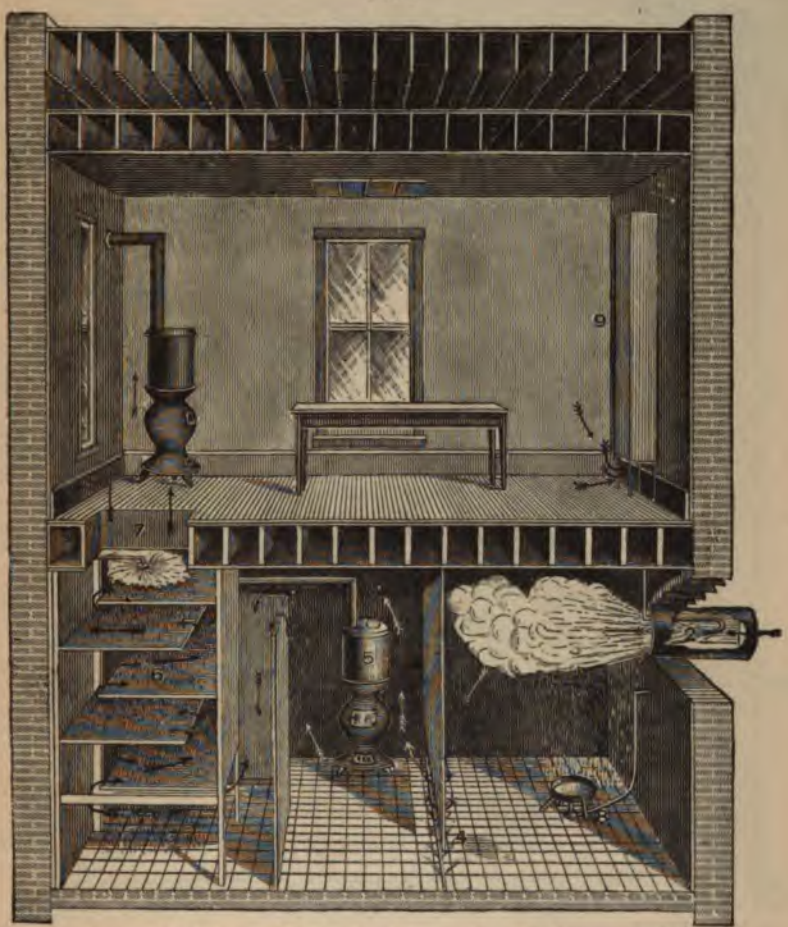
The dry filtration, by means of cotton or other sub the particulate material floating in the atmosphere, w thought to be practicable, on account of the rapidity n of air in sufficient amount.

It is intended in Fig. 4 to illustrate the applicatio well as to surgical purposes. For sanitary ends the s of a person from the evil agents in general, outside of passing through a harbor in a locality infected by yello the other hand the protection of persons outside from patient brought into a previously uninfected district.

On ship board, the ventilation is supposed to be se apparatus; on land some power most convenient.

The plan of filtration through cotton is illustrated tary purposes, and in Fig. 5, for surgical purposes alone

FIG. 1.




*Basement below and Operating Room above—Scale, one to sixty.*

On the right hand is an entrance ventilator 20 inches in diameter, in which is a steam jet for the purpose of infiltrating the entering air with very fine globules of water. (2) (3).

The air thus moistened passes, in the direction of the arrows, under a screen which descends near to the floor (4). It is then warmed by a stove (5).

The air then passes up and down over the top of another screen and up through a series of dripping shelves (6) and through a spray (7) into the operating room above.

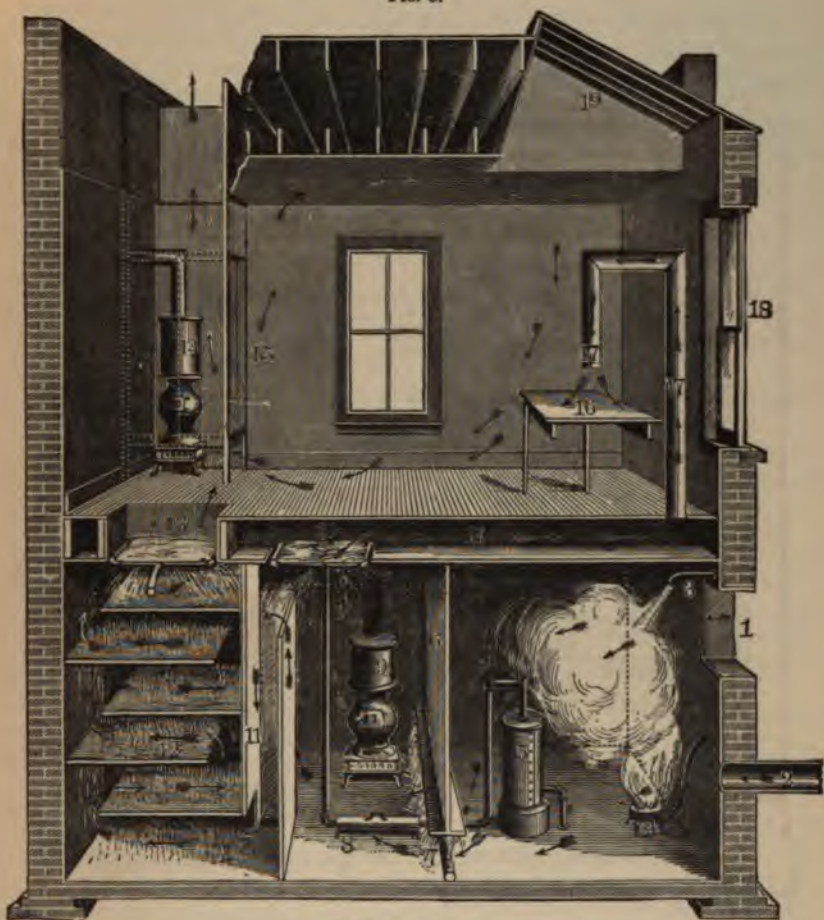
The exit ventilation is from the floor through the shaft (9) communicating with an opening in the roof. Under the entering flow of air (3) is pot (8) for burning sulphur, which is supposed to combine with the condensed steam and form a disinfecting solution in exceedingly fine particles.

It has been found that the smell of a moderate flame of sulphur may be thus entirely suppressed so as not to be perceived in the room above.

Fig. 2.

1. Window admitting outside air.
2. Steam for moistening all floating particles.
3. Sulphur pot, with Bunsen burner under it, for slow com
   secured by mixing alcohol with the sulphur.
4. Spray of water through which the air must pass in going to
5. Stove for heating the air which has been once washed.
6. Screen for forcing the air to pass from near the ceiling thro
7. Shelves of thin muslin through which water drips from
   above.
9. Entrance of the air of the room into the draught heated to
10. Stationary partition.
11. Movable portion hinged above, and taking a horizontal posit
    the roof, when the room is used without running the ven
13. Skylight.

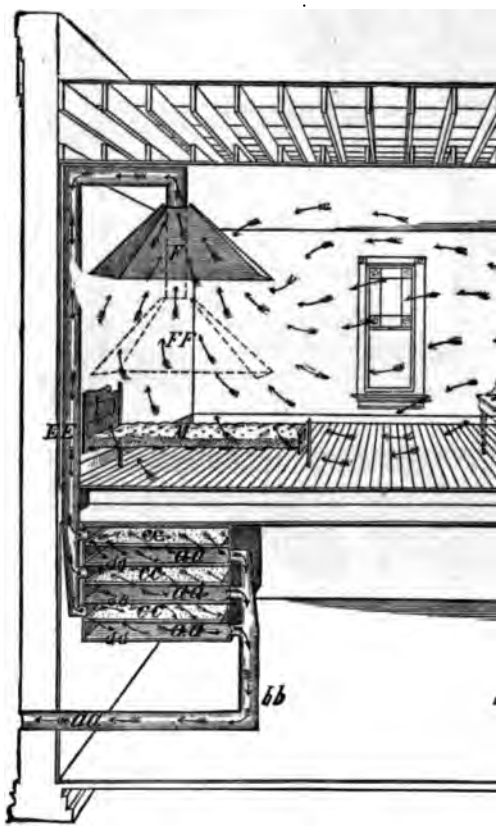
FIG. 3.




*Scale, One to Sixty.*

1. Entrance of outside air, closed when the pipe (figure 2) is in use.
2. Entrance of air blown in by a fan run by an engine for hot weather. Specific gravity is relied upon in cold weather to secure atmospheric motion and change.
3. Steam Jet.
4. Sulphur Flames.
5. Reservoir for Solution of Corrosive sublimate.
6. Screen or Partition open fifteen inches next the floor.
7. Spray of water through which steamed air must pass.
8. Box for flame for heating water as it runs through the pipe.
9. Stove.
10. Spray of Sublimate water for the second washing of the air which passes through 18, 17.
11. Screen, the arrows showing the course of the air.
12. Series of muslin shelves.
13. Spray, producing the shower for the second washing of the air going to the room above.
14. Stove for increasing exit draft.
15. Screen separating the space around the stove from the general air of the room, obliging the escaping air to go from the floor.
16. Table.
17, 17. Pipe for conveying sterilized air to the region of a surgical operation.
18. Window.
19. Skylight. The arrows show everywhere the course of the air.

FIG. 4.




*a*, Inlet pipe.
*aa*, Outlet pipe.
*b*, Ascending inlet pipe.
*bb*, Descending outlet pipe.
*E*, Ascending inlet pipe.
*H*, Ascending surgical pipe.
*O*, Descending surgical pipe, to be raised or lowered.
*K*. Thermometer.
Under *g* and over *gg* is the oblique *surgical* branch of the inl
*Gas*, Gas flame for regulating the temperature of the air esca
*S*, Steam jet for regulating the moisture of the same air.
*g*, At the top of the straight pipe *g* is an eye looking at the fl
end of the inlet pipe for the *sanitary* use of purified air.
*gg*, Over *gg* is a screen to interrupt the straight horizontal bl
*EE*, Descending outlet pipe.
*F*, Canopy.
*FF*, Canopy let down.
*L*, *Surgical* table *in section*.
*M*, *Sanitary* bed *in section*.
The important objects are in section.

*c*, *c*, *c*, 3 cotton fil
*cc*, *cc*, *cc*, 3 cotton
*da*, *da*, *da*, 3 floors
*dd*, *aa*, *dd*, *aa*, *dd*,

The room in which this scheme has been worked out for *surgical* purposes has a capacity of 3360 cubic feet.

The air is taken from outside the building and carried through 960 square inches of cotton an inch thick, by means of a fan or blower, which theoretically should change the whole air of the room once in five minutes. Any object exposed under the tube is shielded from the contact of the general air of the room.

The blower (No. 00 of the Sturtevant manufacture) revolves 3512 times in a minute. This is a rate of speed which makes very little noise and is sufficient for the purpose. At this rate of speed, it is estimated by the manufacturer to carry 662 cubic feet of air in one minute. This rate of air supply would completely change the air of the room in five minutes.

There are, however, three elements of loss, viz.: the slipping of the band, the escape by leakage through a long pipe, and the resisting influence of friction by which the fans of the blower slip on the air which they propel. It may be assumed that this loss amounts to one-half. The air of the room would then be completely changed once in ten minutes.

The fifth figure illustrates the application of the principle to surgical purposes alone, and has been executed especially for use in this presentation of the subject.

A sufficient number of observations have been made upon substances capable of decomposition, to show a great superiority in the freedom of this cotton-filtrated air over the air of the same room, and over the air of outdoors, and also of that in other parts of the house. It is certain, therefore, that the endeavor has been successful, to the extent of securing for surgical purposes an atmosphere far superior to that of the open outdoor air. By this apparatus, it is practicable to make a laparotomy in an amphitheatre filled with spectators, any number of whom may have just come from dissecting rooms and wards having erysipelatous patients, while the air enveloping the wound in progress of being made shall be as pure as that of a snow-covered mountain.

An observation, commencing June 22d, 1887, by Dr. Grant Cullimore, in which nine tubes containing sterilized peptonized beef broth were exposed (1) under the blower supplying the air which had passed through the cotton filter, seventeen minutes.

On the same day and under the same circumstances, nine tubes were exposed seventeen minutes in each of the three other rooms numbered 2, 3 and 4. No. 2 (cottage) is in a detached building of two rooms, unoccupied for several months. No. 3 (upper floor) has been unoccupied several weeks, but some months before had in it erysipelas, gangrene and diphtheria. Room No. 4 is a dissecting room one month after its use; the air being still from the closure of door and window. The tubes, after exposure and sealing with cotton, were kept in an incubator with a uniform temperature of 100° F.

Other observations employing liquids and also potato slices, have shown a great superiority of the purity of the air thus filtered over that of the open air and that of rooms, whether empty or occupied.

The observation of Dr. Grant Cullimore is sufficient to publish in detail as an illustration:—

23d. (1) The tubes exposed to cotton-filtered air all remained clear.

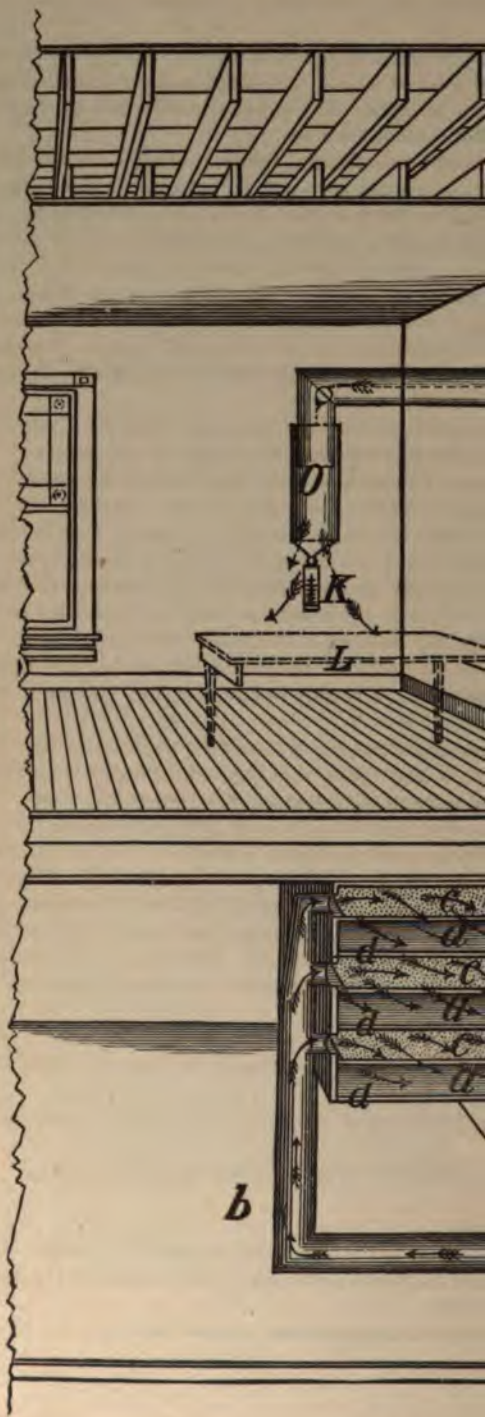
24th. Same condition.

25th, 26th, 27th. No observation.

28th. Each of the nine tubes held up by the side of No. 9 of series (4) shows a cleanness in great contrast. This tube of the fourth series was slightly turbid, and under the microscope showed the bacillis subtilis.

(2) This room (cottage) has been unoccupied several months, but the windows have been left open.

Fig. 5.



23d. (2) Two tubes (Nos. 3 and 8) are turbid, showing long bacilli with spore formation.

24th. Same condition.

25th, 26th, 27th. No examination.

28th. Tube No. 2 shows a small deposit at the bottom, clear in the middle portion. At the top a film hangs together and is not easily separated—of a dirty brown color on top and white below. Among other microbes is that of the yeast plant. Tubes numbered 1, 4 and 9 remain clear.

June 22d. (3) Nine tubes exposed seventeen minutes in room (3), upper floor.

23d. Four tubes, 1, 2, 3 and 5, are turbid. Two with vibratile bacilli of medium length; one shows rods without motion, and one a film, which shows microscopic bodies like crystals of cerium oxalate.

24th. Same condition.

25th, 26th, 27th. No observation.

28th. Tubes Nos. 1, 4, 6, 7 and 9 clear. Tube No. 2 shows mycelium, bacilli and spores.

(4) Dissecting room.

June 22d. Nine tubes exposed seventeen minutes.

3d. Two tubes, Nos. 6 and 8, have a thin pellicle at the top, easily broken up. The microscopic appearance is like that of mycelium. Tube No. 5 showed bacillis subtilis; 8 and 9 turbid.

24th. Same condition.

28th. Tubes Nos, 1, 2, 3, 4 and 7 remain clear. Tube No. 9 showed slight turbidity from commencing development of micrococcus, and was used for comparison with the tubes of the first series exposed to sterilized air.

The good behavior of the air of this dissecting room is accounted for by its stillness and the opportunity for its dust to settle.

The question of microbic influence upon the results of wounds of closed cavities, is further illustrated by a statement made before the French Surgical Congress meeting in Paris, in April, 1885 (*Revue de Chirurgie*, March, 1885, page 359), by M. Abadie, of Paris. In the course of extended remarks upon this subject, are the following paragraphs :—

"A factor of the greatest importance is the microbic element. I can easily demonstrate this by taking the experience of ophthalmic surgeons, when, after an operation for cataract, there appears suppuration in the eye. This complication should not be attributed to some influence of diathesis, but to some infecting cause. The essential condition is local and external.

"Previously to antiseptic practices, it was remarked, that suppuration did not occur after iridectomy, though a frequent accident after cataract extraction. The reason is, that after the operation for cataract the aqueous humor is modified so as to contain more albuminoid material, becoming a better medium for culture, and of the multiplication of the microörganisms of suppuration.

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*Explanation of Figure 5.*

*a, b.* Entering pipe, seven inches in diameter.
*c, c, c.* Three cotton filters, forty inches square, the cotton being an inch thick, over which the air enters as indicated by the arrows. There is another set of filters in another box, making 9600 square inches of cotton through which the air passes.
*d a, d a, d a.* Spaces from which the filtered air escapes.
*E.* Exit pipe collecting the filtered air from under the filters.
*Gas.* Gas jets for warming the air.
*S.* Steam spray for moisture.
*g.* Straight pipe for observation.
*gg.* Oblique portion.
*H.* Vertical portion.
*O.* A sliding portion to regulate the height of the exit.
*K.* Thermometer.
*L.* Operating table.

"At this time, I think that sufficient care is tak assistants, and of instruments, but the atmospheri neglected. The best protective dressings are applied already been made.

"The air in which we live is surcharged with micr which hasten putrefaction and interfere with the regul

This is an extravagant estimate of the exclusive evi ing the eye, because we know that eyes are lost from membranes are not ruptured and from diseases which tion made, however aseptically, upon an eye about to must terminate disastrously.

There is no doubt, however, that most of the eye might have been saved by the avoidance of the entra ticulate material.

The following statistics are interesting in this conn

Dr. Arthur E. Prince has made cataract extractions since its opening in November, 1884, without a case of In each case an ointment of iodoform, two parts in a duced into the conjunctival duplicatures before the ap

Of a series of sixteen cases performed successively i rooms in this private hospital, the first and the last destruction. In the last patient belonging to this list, well and the other went into destructive inflammation ture and delirium, terminating in death. The two lis forty-nine in succession were successful.

The elimination from the estimate of dangers in la tamination, has been accomplished by the employme extent, as nearly to place it outside of the estimated fa case.

The necessity remains for attention to the fingers, napkins, to drainage and the mode of dressing, but it i tion to go into these questions.

It is not assumed that the technology of laparotom ized air for the envelopment of a wound in the progre shock, hemorrhage, obstruction of the bowels from infla subsequent entrance of putrefactive and other infectio

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## THÉRAPEUTIQUE COMPARATIVE DES

### COMPARATIVE THERAPEUTICS OF UT

### VERGLEICHENDE THERAPIE DER U

PAR D. ANGEL VILLA (DE BUE
Assistant à la Clinique Gynécologique d

On peut diviser les traitements des fibro-myômes méthodes: les méthodes *radicales* et les méthodes *palli*

Les premières ont pour objet de supprimer les décisive.

Les secondes ont pour but de modérer ou de su

occasionés par ces tumeurs, tels que l'hémorrhagie, les troubles nerveux, la douleur et la consomption générale de l'organisme, et finalement l'impuissance physique.

Il y a encore une autre thérapeutique, qui prétend mettre au premier plan d'abstention de toute intervention. Cette troisième méthode, se basant d'une part sur les dangers des opérations radicales, et d'autre part sur l'inutilité, l'inefficacité des méthodes d'action palliative, abandonne au temps le rôle d'arrêter l'acroissement du fibrôme et de supprimer les troubles qui en dépendent. Ce rôle est dévolu à la ménopause.

Elle s'aide de moyens doux tels que le repos et la balnéation minérale. Il n'est pas nécessaire de faire le procès de cette thérapeutique basée sur l'expectation la moins justifiable.

Quand une femme est affectée d'un fibrôme utérin, de deux choses l'une: ou bien il y a des acccidents sérieux, et ces accidents s'aggravent d'une façon continue et dangereuse même pour la vie; donc il faut y porter un remède efficace. Ou bien le néoplasme se laisse supporter sans causer de troubles graves, et dans ce cas in nest pas indispensable d'agir.

C'est donc à la première catégorie de cas que la thérapeutique active doit s'adresser surtout. Il est bon toutefois de dire, que plus et mieux on étudie les prétendus fibrômes qui évoluent sans produire d'accidents, et plus on se persuade que leur rareté est extrême. Il est exceptionnel que les catarrhes et les hémorrhagies qui accompagnent leur évolution, à défaut d'autre complication, ne déterminent et n'entretiennent pas des phlegmasies intra-utérines, qui se propagent aisément aux annexes et au péritoine. Il faut aussi prévoir le moment où l'accroissement considérable de la tumeur et l'apparition tardive des symptômes habituels créera, au bout d'un certain temps, une nécessité d'intervenir qui n'existait pas absolument au premier moment. Or l'opération, simple alors, devient plus scrabreuse à une période plus avancée.

Cette considération étant émise, il est nécessaire d'envisager les deux systèmes d'intervention indiqués en commençant.

Je vais exposer ici les considérants et les conclusions dont découlent les régles adoptées par la clinique du Dr. Doléris. Ces règles sont à la fois résumé de sa pratique et de son enseignement.

### I° MÉTHODES RADICALES.

Elles comprennent les divers procédés *d'ablation* des tumeurs, *l'énucléation*, *l'hystérotomie* et *l'hystérectomie.*

Les efforts s'accentuent tous les jours pour obtenir l'amélioration de ces sortes d'opérations, et arriver à diminuer la mortalité qui malgré tout reste considérable.

Cette persistance du chiffre élevé de la mortalité tient plutôt à un défaut de discernement dans le choix de l'opération, basé sur un diagnostic insuffisant, qu'à la défectuosité même des méthodes. Ceci n'a pas besoin de grandes preuves.

Si l'on considère *l'hystérotomie ou l'hystérectomie* pratiquées par la *voie abdominale*, on peut accorder que d'un côté les perfectionnements apportés par Schrœder et plus récemment par Billroth et V. Haacer à la méthode du pédicule intra-abdominal ou à la méthode mixte,—d'autre part la sécurité relative de la méthode avec pédicule extra-abdominal de Péan, ont amélioré notablement les résultats statistiques.

Toutefois les chiffres de la mortalité sont restés encore assez élevés pour que la voie vaginale ait paru supérieure, en particulier à Péan qui pratique aujourd'hui volontiers l'hystérectomie vaginale totale, par morcellement, des tumeurs les plus volumineuses.

Cette manière de faire comporte des garanties de succès mais elle a aussi ses revers. Outre que souvent le morcellement total de l'utérus, et des grandes tumeurs qu'il contient, et une opération fort longue et assez laborieuse pour nécessiter plus de trois heures de durée, les conséquencs en sont assez souvent fatales pour donner à réfléchir.

Pour bien saisir en quoi pèchent l'exclusivisme de ces deux voies, la voie *abdominale* et la voie *va* les grandes tumeurs, c'est-à-dire celles qui occup l'abdomen.

Le choix doit être basé, non sur une vague préfér mais : 1° sur la siège de la tumeur, 2° sur les dimensi

1° La tumeur est *dans la paroi utérine*, interstitie ou moins pédiculée.

En réalité elle évolue hors de la cavité de la ma avec l'hystéromètre, ou trouve quelle ne dépasse que soit en hauteur soit en largeur. Si, d'autre part, on les rapports du segment inférieur de l'utérus avec le partie isolée, faisant un angle rentrant très marqué a

Vouloir traiter un tel cas par le vagin, pratiquer l' lement, et dépeser par segments la tumeur pour l'extr le conduit utéro-vaginal ; ou fragmenter l'utérus lu connaît que difficilement les prolongements et les rapp incomparablement plus difficultueux, plus long, plus ment que l'opération par la voie abdominale. Or, il dernière voie, l'hystérotomie sera toujours relativen mieux circonscrire, la suture portant sur un segment utérine ne devant être ouverte que très exceptionnelle

De ce premier aperçu il résulte que, justement là périlleuse et difficile, l'intervention par l'abdomen est

2° La tumeur est encore dans la paroi utérine, couche interne de cette paroi ; elle tend a saillir d muqueuse. La cavité de la matrice est elle-même t largeur. Dans ces cas le cathétérisme utérin donn centimètres. La capacité est telle, qu'après la dilata le doigt se meurt largement et aisément dans le condu

C'est ici le succès du morcellement par la voie va ment a été précédé par les anciens procédés d'énucléa d'abord à cause de leur insuffisance dans les cas de *my* accidents inflammatoires consécutifs. Ce dernier in évité ; mais l'énucléation n'est possible qu'à la cond limitée, et en tout cas, ce procédé est toujours plus l l'ablation de fragments successivement saisis, maint pinces solides. On peut même dire que l'ablation q les résidus de la tumeur disparaissent, règle générale.

Notre statistique est tout en faveur de cette opér cable aux tumeurs du segment supérieur que du segm ne demande pas que le fibrôme soit le moins du mon certainement destinée, par sa légitimité, et par sa séc raisonnement à prendre un rang important dans la th

Or, l'intervention par la voie abdominale comport difficulté et de danger. Quelle que soit la méthode a utérine, il faudra opérer l'ablation jusqu'au col, parfo l'antisepsie avec un redoublement de prudence ; en s risques très sérieux ; et pour celui qui a la pratique des le vagin, dans de pareils cas, la comparaison n'est mêm la dernière voie comparée à la première est considérab

J'envisagerai maintenant les fibrômes de *moyenne*

sera que pour faire resortir ce qu'il y a d'exagéré dans la tendance à opérer l'ablation *totale de la matrice* pour ces sortes de tumeur.

Tout gynécologue sait avec quelle facilité on arrive à l'ablation des fibrômes intra-utérins sous-muqueux, pédiculés, sessiles, interstitiels. La décortication, l'énucléation ne sont guère plus malaisés ni plus dangereuse que l'ablation simple.

La statistique de M. Doléris qui porte sur quatorze cas, ne comporte pas un accident post-opératoire. L'ablation a été pratiquée, après la section, bilatérale du col, soit par application d'une pince à forcipressure coudée, placée sur le pédicule et section avec les ciseaux, la pince étant retirée après vingt-quatre heures ; soit par l'énucléation avec la spatule et les ciseaux, suivie de l'extraction avec des pinces de divers formes soit par la fragmentation préalable en deux parties au moyen du bistouri et l'attraction étant combinée à la torsion, avec des pinces solides.

Enfin les très petites tumeurs interstitielles peuvent être amenées à faire saillie à la surface muqueuse, par une dilatation permanente et progressive de l'utérus, dont la paroi s'amincit de plus en plus. Une incision au bistouri sur le point de la paroi correspondant au fibrôme, suffit à assurer l'issue du néoplasme. Vulliet de Genève a préconisé ce procédé qui, en effet, est souvent très aisé à mettre en pratique, mais est aussi, souvent très long et inutile, en ce qu'une fois l'utérus ouvert par un procédé quelconque, la saillie du fibrôme est suffisante, pour que sa libération soit facile, sans autre dilatation

MÉTHODES PALLIATIVES.

1° *Castration.*—Il est nécessaire d'être très bref sur cette opération qui n'a pas réussi encore á conquérir l'unanime approbation des chirurgiens. Il est fâcheux que dans les cas rapportés on n'ait pas assez précisé le siège exact et le volume des tumeurs. La discussion serait alors possible. Toutefois, il est certain que ce procédé est souvent infidèle, et on peut se demander, en effet, ce que peut l'ablation des ovaires, la *ménopause artificielle*, sur une tumeur sous-séreuse par exemple, tumeur vivant presque d'une vie indépendante de la matrice, grâce à sa pédiculisation plus ou moins prononcée. Les très grosses tumeurs sont en réalité peu influencées par la castration. On peut comprendre, tout au plus, que la suppression du molimen ovarien diminue les phénomènes nerveux habituels dans les cas de fibrômes ; que les tumeurs interstitielles de moyen volume, les myômes diffus surtout, vivant plus intimement de la vie propre de l'utérus, confondant leur circulation et leur innervation avec les siennes, soient de même impressionnés heureusement dans leurs processus trophiques ; que les myômes du corps, voisins des cornes utérines, soient anémiés par la section des vaisseaux et des nerfs vasculaires utéro-ovariens, lorsque cet appareil et très développé, ce qui n'est pas la règle; mais ces explications ne sont que des hypothèses, émises par notre maître dans ses conférences, et demandent une consécration de la part de l'observation clinique.

2° *Section bilatérale du col.*—Cette opération très ancienne a pour but la suppression de l'hémorrhagie, et de la tension douloureuse ou de la douleur réelle occasionnées par l'ampliation du néoplasme sous l'influence de la menstruation. Quelques gynécologues italiens l'ont forcement préconisée dans ces deux derniers mois.

Cette opération, pour nous, agit comme agit parfois l'ablation de l'ovaire, c'est-à-dire en anémiant la tumeur. Dans l'esprit de M. Doléris le but à poursuivre est la section, pratiquée aussi haut que possible, de toutes les principales branches de l'artère utérine. Comme l'émergence de ces branches est latérale, la section doit porter sur les côtés. Il la pratique avec de forts ciseaux ; et quand elle a dépassé l'orifice interne, il fait la suture bilatérale au fil de soie, comme pour l'opération d'Emmet, après avoir préalablement touché les surfaces cruentées avec une forte solution d'acide phénique, dans le but d'empêcher la coaptation ; la suture assure simplement l'hémostase immédiate. Le huitième jour, on enlève les fils, et on touche à nouveau les surfaces de section avec la solution forte d'acide phénique (un pour 10), et on surveille la cicatrisation.

De cette façon, les coagula intra-vasculaires s'organi
s'opère dans l'utérus et dans la tumeur.

Il est à croire que l'action favorable ne saurait êtı
de facile volume, occupant le segment inférieur de l'
tainement leur pédiculisation et leur issue à l'exté
tumeurs du fond de l'utérus ne doivent vraisemblabl
moins d'une façon durable ; les fait consignés sont e
voir et permettent, à défaut de l'ablation immédiate
bilatérale, dans le cas de petits fibrômes, qui saignent
des segments du col ou très près de lui.

*Râclages. Injections intra-utérines.*—Ces procédés vi
par un état pathologique de la muqueuse. Des recl
qu'elle pouvait être, dans le cas de fibrôme, affectée
tion chronique avec altération des vaisseaux. Le râcl
après expérience, cet effet n'est que passager : les
graves qu'auparavant. Il n'est pas même besoin que

L'échec du râclage de la muqueuse utérine se com
véritable pathogénie de l'hémorrhagie dépendante des

Lorsque, ainsi que nous venons de le dire, et ains
très consciencieuses du Dr. Wyder, la muqueuse utéri
forme végétante, l'abrasion du tissu morbide et la
affaiblis, peut, de ce seul fait, supprimer l'écoulem
nouvelle muqueuse qui viendra remplacer l'ancienn
de texture et de résistance parfaitement normales.
chose soit possible à obtenir d'une façon absolumen
sujet à des troubles constants comme ceux qu'entrai
évolue. Il est même à croire que si les germes d'une
matoire ou hyperplastique, existent dans les éléments d
de les déraciner en totalité.—La difficulté d'un râclag
de lésions *ultra-utérines* (salpingite), d'autre part, e
râcler exactement une surface irrégulière, déformée, a
surface interne de l'utérus bossuée par un ou plusieur
cavité, n'est pas toujours chose aisée.

La *salpingite*, n'est pas rare non plus, lorsqu'il
développement rapide, surtout. Dans un cas d'hystér
gros myôme occupant la totalité de l'utérus, M. D
trompe du volume d'une orange et plein de pus. Cell
la paroi pelvienne, et ces parois avaient quatre ou
muqueuse était végétante, et tapissée de pus concret.

Dans un cas analogue, l'une des trompes seule éta

Dans un troisième cas, observé chez une malade d
existait une énorme collection purulente qui s'éten
cavité abdominale, et qui se vidait d'une façon interm
cette variété d'abcès enkysté du bassin était la tromp
pleine de pus, coïncidant avec un fibrôme utérin de m
les sécrétions exagérées qui accompagnent l'évolutio
quence des hémorrhagies prédisposent la malade aux
décomposition septique des liquides produits en ab
génitales. Le sang s'altère très rapidement dans c
odeur quasi-putride caractéristique. Rien d'étonnar
salpingite naissent fréquemment dans ces conditions et
d'étonnant, non plus à ce que l'endométrite guérie, o

se reproduise du fait de la persistance de la salpingite.—Sur une pièce conservée au laboratoire de l'*Institut de gynécologie* du Dr. Doléris, on peut apprécier à quel degré s'établit parfois, la communication de la cavité utérine avec le conduit de la trompe. Sur cette pièce on voit que toute la portion interstitielle de la trompe, autrement dit, tout son trajet utérin est converti en un canal qui logerait aisément une plume de corbeau, et cela sans qu'il existe une lésion bien notable du conduit. Un semblable élargissement s'observe sur d'autres pièces, quoique moins marqué. En même temps qu'il fournit la démonstration de la récidive possible de la lésion utérine, il explique certains accidents observés parfois au cours des irrigations intra-utérines lorsqu'il existe des tumeurs fibreuses dans les parois de la matrice.

Notre conclusion est donc que quand l'hémorrhagie, dans certain cas de myôme, peut être soupçonnée avoir son origine dans la muqueuse utérine malade, le râclage de cette muqueuse ne saurait fournir une garantie tant soit peu certaine contre le retour du sang.

Si maintenant nous envisageons, ce qui est plus conforme à la fréquence des faits observés et ce qui s'accorde mieux avec le raisonnement, que l'hémorrhagie, dans le cas de myôme, et due surtout à la lésion des vaisseaux sous l'influence de l'expansion brusque de la tumeur qui distend et écarte violemment les faisceaux musculaires. Si l'on accepte que les hémorrhagies sont rares ou nulles lorsque l'évolution du myôme se fait vers la cavité abdominale (*myôme sous-séreux*); qu'elles sont surtout fréquentes et abondantes lorsque le myôme est *interstitiel*, et séparé de la muqueuse par une couche plus ou moins épaisse de tissu musculaire, qu'elles deviennent enfin redoutables lorsqu'il n'est recouvert que par la muqueuse (*m. sous-muqueux*), on appréciera que la perte de sang ne peut être que le résultat d'une sorte de traumatisme. Ce traumatisme est le fait de la pression excentrique exercée par le néoplasme turgescent sur la coque musculaire qui l'emprisonne. Comme cette coque est plus mince du côté de la cavité utérine et comme les ramifications vasculaires sont plus abondantes sur cette face de la tumeur, c'est la muqueuse et le stratum musculaire sous-muqueux qui subissent le maximum de la violence. Ils se distendent, se dissocient, s'éraillent, les capillaires se rompent et il se fait une perte de sang abondante.

Cette perte survient habituellement, non pas le premier jour des règles, qui sont fort prolongées, mais plutôt le deuxième ou le troisième jour. Elle est précédée par une douleur tensive ressentie dans l'utérus tout entier et par une notable augmentation de volume de l'organe. Cette douleur et cette augmentation de volume peuvent céder lorsque l'écoulement de sang survient, mais, en règle générale, elles persistent encore pendant l'hémorrhagie, et presque tout le temps que dure le molimen congestif.

Lorsque le molimen cesse, on voit apparaître des caillots et du sang liquide parfois. Les caillots sont le produit des hémorrhagies interstitielles produites précédemment, de l'infiltration sanguine des tissus disposés au-dessous du fibrôme. Le sang liquide provient des capillaires affaiblis, et cette perte secondaire moins abondante mais prolongée s'explique aussi par la rétraction insuffisante du tissu. Ces faits ont été souvent mis en évidence par M. Doléris sur des femmes affectées de fibrômes interstitiels tendant à se pédiculiser. La curette ramenait habituellement des caillots minuscules provenant de point précis où plus tard le néoplasme accentuait sa saillie. De plus, le tissu, à ce niveau, était mou, spongieux, infiltré. Comment, apprès cette interprétation basée sur la logique des faits, admettre que le curage peut avoir une réelle efficacité contre les hémorrhagies dans les cas de myôme?

En réalité il n'en a pas, et n'en saurait avoir. Notre statistique montre que, malgré des râclages énergiques, répétés plusieurs fois, les hémorrhagies se répètent lorsque la tumeur suit son développement progressif vers la paroi interne de la matrice. Lorsque au contraire la tumeur tend à saillir vers la péritoine, il est assez naturel d'admettre que si elles cessent alors c'est à cette circonstance et non au râclage qu'est due la cessation des pertes.

Ce long exposé de la double pathogénie des hémorr
quand nous envisagerons les effets de l'électricité,
tentes etc., etc.

*Injections intra-utérines.*—Leur emploi ne saurait
soupçon d'un état inflammatoire chronique de la mu
pertes de sang ou la décomposition septique des liquid

La critique que nous venons de faire du curage, n
ment mais nous ferons ressortir qu'au moins les irriga
d'être d'une pratique aisée sinon d'un effet très-effica
si c'en est un, elles offrent un inconvénient certain :
liquides injectés, de la cavité utérine dans les trompe
d'autant plus à redouter que la tumeur sera plus vo
le fond de l'utérus, à cause de la participation des c
ment utérin des trompes, à l'hyperplasie fibreuse.
désastreux que le liquide injecté sera plus toxique
imprudence, et l'insuffisance de reflux du liquide po
dents. Dans un cas de notre clinique, bien que l'irri
la sonde de M. Doléris, par M. Doléris lui-même, la
que l'écartement des branches n'avait pas été poussé
pression, le retour du liquide qui était de la liqueur
malade fut prise de douleur violente dans le ventre,
etc. Ce qui prouve que le liquide avait dû pénétrer l
dité avec laquelle les phénomènes toxiques hydrargyr

Il y aura cependant à tenir compte, malgré tout, d
quand il existe un myôme, compliqué d'écoulement
guarantie d'une réussite heureuse en cas d'interventio

Hormis cette considération, il n'est pas soutenable
utilité.

TENTES DILATATRICES. BÂTONNETS

Les procédés qui correspondent à cette double pr
double action : 1° *Action excitante*, sur la musculatu
et sur l'innervation de la matrice ; 2° action médica
sique analogue à la précédente, sur la *muqueuse utérin*
la *medication*, l'*excitation* par contact, la *modification*
résultats de ces actions combinées ou séparées ? Peuv
déterminés par la présence d'un fibrôme volumineux
n'est pas vrai, au moins pour les cas qui appartienn
certain nombre de femmes qui n'étaient affectées que
volume, la dilatation a été faite, à plusieurs reprises d
préliminaire d'une autre intervention, et jamais on
sible de la tumeur. Apparemment, M. Vulliet qu
d'idées que M. Doléris n'a pas dû observer des effets
premier indiqué la marche thérapeutique ultérieure
croire que, puisque pour les petites tumeurs ces procéd
plus favorables contre les tumeurs qui dépassent l'om
une révision sévère des cas publiés, et surtout de la
Mais ce dernier point est impraticable. On ne peut q
l'interprétation erronée de quelques faits heureux où,
tion a contribué à hâter la résolution d'un exsudat
fibrôme interstitiel, hors de la trame musculaire de
fibrôme sous-séreux.

On ne peut donc considérer l'action des tentes dila

menteux que comme un faible moyen palliatif des phénomènes morbides dûs aux fibrômes, et c'est tout au plus si on peut accepter qu'ils puissent modifier heureusement la muqueuse et exciter la musculature de l'utérus assez pour diminuer les pertes ou les espacer, et faire cesser un écoulement fétide.

*Electricité.**—Il n'y a pas de méthode qui ait été préconisée avec plus d'enthousiasme et reçue avec plus de méfiance que celle-ci. La chose s'explique d'elle même.—Les promoteurs des pratiques basées sur l'action électrique ne se sont pas contentés de laisser à cette action la seule valeur qui pouvait lui convenir et la faire accepter à la rigueur: celle d'*un palliatif* parfois efficace, mais ils ont voulu l'élever à la hauteur d'un moyen de *cure radicale.* Or, vouloir avec l'électricité ou avec un procédé quelconque faire disparaitre totalement un *néoplasme*, c'est-à-dire un processus essentiellement voué à une progression quasi-fatale, tient un peu de la prestidigitation et du merveilleux. De là, la méfiance. Cette méfiance se produit chaque fois que l'on découvre un nouveau procédé thérapeutique, c'est vrai, mais elle a sa raison d'être lorsque ce procédé est basé sur des exagérations, et surtout lorsqu'il bat en brèche, sans preuves suffisantes, un dogme pathologique. Le dogme ici est l'*évolution* bien connue des tumeurs, à quelque genre qu'elles appartiennent. Ni les remèdes contre le cancer ni les moyens physiques, dynamiques ou chimiques contre les fibrômes, à moins d'agir par voie de destruction, à la façon des caustiques, n'ont prouvé j'usqu'ici leur efficacité.

Et pourtant les apôtres de cette thérapeutique sont de bonne foi, cela n'est pas à mettre en doute.

Leur erreur est basée, partie sur quelques diagnostics hasardés, partie sur une conception erronée de la structure des myômes, partie sur l'oubli des distinctions à faire entre les diverses variétés de myômes, partie enfin sur une investigation clinique insuffisante due peut-être à une exploration mal dirigée. Il suffit de lire quelques-unes des observations relatées pour en être convaincu.

Ces erreurs et ces oublis, sont à la vérité, le fait de tous les gynécologues, quelles que soient leur éducation scientifique et leur habileté pratique; mais il faut bien reconnaître que ceux-là se corrigent plus promptement, qui varient davantage leurs méthodes thérapeutiques.

La réussite d'un procédé substitué à un autre, l'expectation simple parfois, les signes physiques observés cliniquement, contrôlés plus tard par l'examen direct post-opératoire, telle est la véritable école où se forme le jugement.

Il est à craindre que cette école n'ait fait défaut à quelques défenseurs de l'électrothérapie, car les théories qu'ils ont émises, et les bases de leurs propositions thérapeutiques sont parfois au moins singulières. De toute évidence leur exclusivisme leur a uni sensiblement.

D'ailleurs le dernier mot n'est pas dit et notre but est uniquement ici d'expliquer, non de juger.

Nous envisagerons les procédés généralement employés.

*Electrolyse.*—L'idée de l'emploi de l'électrolyse contre les fibrômes est née en Amérique avec Cutter en 1871. Brown, Kimball, Gaillard-Thomas, Semeleder, etc. (voir la thèse de Lucien Carlet, Paris, 1884), suivirent cette pratique avec des succès divers. L'électrolyse a été appliquée depuis de deux façons : à la surface de la muqueuse utérine, ou dans la profondeur de la tumeur elle-même.

Le pôle actif est appliqué directement en contact avec l'utérus par ponction du néoplasme avec un électrode lancéolaire ou par application, sur la muqueuse, d'un électrode-hystéromètre de platine.

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* Ce paragraphe résumé exactement les idées de M. Doléris et a été revu par lui. Cette note est nécessaire pour indiquer que notre maître associe pleinement son opinion à la nôtre.

Le pôle inerte, destiné seulement à établir le couran son action se diffuse par l'interposition de substances di

L'action électrolytique est présomptivement basée dénutrition de la tumeur qui, sous son influence, se rés et finalement, dans certains cas, disparaîtrait; effectiv de la transformation des tissus mis au contact des décompose les tissus et fixe les éléments *acides* de ces les éléments *basiques.—Résultat:* Le tissu mis au conta une action chimique analogue à celle produite par les trisation fibreuse, solide, rétractile. Le tissu mis au co subira l'action chimique des bases (potasse caustique) e

Telle est, en deux mots, la doctrine physique qui d mais n'a jamais été démontrée scientifiquement par un rience, en ce qui concerne la transformation *cicatri* muqueuse utérine ou des tissus des néoplasmes my importante à démontrer puisque cette transformation en faveur de l'électrolyse. D'ailleurs, puisqu'il ne s' en une masse traversée par des travées cicatricielles de rétractile, ou de l'envelopper en un point accessible de cicatriciel appliqué à la muqueuse et de proche en p remarquer que des flèches caustiques ou des cautérisat susceptibles de donner le même résultat.

Or, rien ne prouve que les applications caustiques quées sur la muqueuse intacte ou dénudée par le grat muqueuse cicatricielle. Personne n'en a vu ni montré trolyse. Et si nous nous en rapportons aux statistique de curage utérin pratiqués par Martin et suivis d'injec fer pur; si nous considérons quelques faits de la statist que la muqueuse n'a été nullement transformée, car el caduque fort bien constituée, à l'occasion d'une grosse ne serait guère admissible avec une muqueuse dever connaît le rôle et la structure de cette muqueuse, une fire à étayer une théorie fort douteuse. Voilà pour l'

Quant à l'électrolyse appliquée en profondeur, quelqu façon que de la variété précédente en usant du pôle l'action *fluidifiante* (Apostoli) du pôle négatif. On peu réalisant, dans leur esprit, une sorte de drainage de l'u

De même que l'électrolyse *positive* appliquée à la hémorrhagies et amener le retrait fibroïde du myôme, par électro-puncture profonde, doit faire dérivation, dé nutrition de la tumeur. "*Si*, dit Carlet dans sa *qu'elle perd trop, telle autre souffre aussi parce qu'elle ne* moins bizarre; il est à croire que l'auteur veut parle pertes et que nous avons tenté d'expliquer à la manièr

Le défaut de la doctrine de la galvano-puncture nég de la structure des fibrômes.

Un fibrôme est un composé d'éléments nodulaire comme une grappe tassée de myômes minuscules, à pendantes; c'est au moins, ce que l'étude microscopique fréquents de beaucoup, nous enseigne. Comment le cette grappe? Nous ne faisons que poser la question.

S'il s'agissait d'un myôme diffus ou d'une hyperthr

être plus aisément, mais c'est l'exception et, dans tous les cas, il serait indispensable de ne point confondre les hypertrophies partielles, les scléroses, les métrites chroniques compliquées d'une subinvolution exagérée avec les processus bien définis qui caractérisent le fibrôme ou mieux le *myôme utérin*. Or, il semble ressortir de la lecture de quelques travaux que cette confusion, volontaire ou involontaire, a dû fréquemment être faite. Apostoli appelle *fibrôme* tout processus fibreux (nous disons scléreux) développé dans l'utérus. C'est une doctrine qui peut avoir son côté séduisant, en raison surtout de la simplification qui en découlerait en théorie et en pratique, mais malheureusement elle n'a pas encore rallié les suffrages de tous les gynécologues. Il est à supposer que beaucoup de succès de l'électrolyse sont fondés sur cette théorie scientifique toute neuve !

A côté de ces quelques considérations, nous ferons ressortir que si les résultats de l'électrothérapie ainsi entendue ne sont pas tous justifiables *a priori*, la technique des procédés employés a fait d'énormes progrès. C'est ainsi que les timides essais de Gallard et Leblond qui employaient une très petite dose d'électricité et craignaient de dépasser cinq à dix éléments au sulfate de cuivre, ont été remplacés par l'application d'un nombre comparativement énorme d'éléments, ce qui permet d'atteindre une intensité de courant et d'action chimique considérable, variant de cent à cent cinquant milliampères. C'est grâce aux modifications apportées à l'ancienne technique que l'on parvient à faire supporter de telles doses aux malades sans provoquer de douleurs.

Le docteur Apostoli emploie la *terre glaise* pour diffuser le courant au pôle abdominal.

Le docteur Ménière emploie la gélosine dans le même but. M. Doléris à adopté maintenant une composition mixte où la gélatine entre en grande proportion.

Une considération très singulière vient se placer ici. C'est la suivante: tandis que les premiers promoteurs de l'électrothérapie utérine se félicitaient de l'emploi des courants faibles et louaient les résultats obtenus avec eux, au point qu'ils contestaient les résultats et critiquaient l'emploi des forts courants, les électrothérapeutes d'aujourd'hui n'en trouvent pas d'assez forts.

C'est ainsi qu'à la clinique du docteur Doléris, nous avons employé ou vu employer parfois des courants équivalents à deux cents cinquante milliampères, sans que les résultats attendus fussent obtenus. Il semble, en effet, que les femmes qui s'habituent assez bien au passage progressif de cinquante à cent milliampères, s'habituent de même à la progression de cent à deux cents et deux cents cinquante. Le malheur est que les fibrômes paraissent s'y faire aussi trop aisément.

*Courants continus interrompus.—Faradisation.* Quelques gynécologues, le docteur Chéron entr'autres, emploient une procédé mixte, celui des courants continus, *interrompus*.

Ici les secousses des interruptions s'ajoutent à l'action chimique, ou plutôt ce serait surtout à ces secousses qu'il faudrait rapporter les effets produits.

Le docteur Aimé Martin suit la même méthode. Ces deux auteurs n'avouent que des résultats partiels; aucun cas de guérison.

Enfin c'est à peine s'il faut citer les tentatives entreprises avec le *courant faradique*, tant les bénéfices en sont insignifiants sinon nuls tout-à-fait.

En résumé, il semble que l'électrothérapie (électrolyse ou courants mixtes) appliquée aux fibrômes utérins se résume pour certains médecins en une diminution ou une suppression des métrorrhagies, de la douleur et une diminution de volume de quelques variétés de ces sortes de tumeurs.

Pour d'autres, l'action irait jusqu'à faire disparaître certains fibrômes et en tous cas, amènerait toujours leur diminution, et la cessation des hémorrhagies.

Pour un petit nombre, l'action serait douteuse ou nulle.

Pour nous, notre expérience, n'étant pas encore faite complètement, nous ne pouvons que rapporter des faits et des chiffres.

Le chiffre des cas de notre statistique est de vingt environ, dans lesquels, on n'a

d'aucune façon observé la *disparition* de la tumeur o
l'intensité chimique des courants employés.

Dans quelques cas, le niveau supérieur de l'utér
examen bien exactement pratiqué a montré á M. Dol
supérieure marquée précédemment sur la paroi ab
inférieure descendait aussi et la tumeur s'engageait
diminution, mais un déplacement en totalité !

Dans quelques autres cas, la diminution a tenu
d'interstitiel était devenu sous-séreux, mais qui, s'il n
volume de l'utérus, réalisait, pour son propre compte, u
à l'utérus et obstruant un district quelconque du bassi

Dans la plupart des cas, toutefois, on a observé un
peu appréciable, après les premières applications, mais

Il est entendu que tous les cas à diagnostic doute
paramétritiques, etc.) ont été soigneusement écartés e
que sur des fibrômes nettement reconnus et de tout vo

Les douleurs n'ont pas été sensiblement modifiées.

Les hémorrhagies, influencées au début chez certai
de reparaître si on a interrompu le traitement, même a
soins assidus.—Grâce à une persistance opiniâtre dans
pu être régularisée dans quelques cas et réduite à des
dans les cas de fibrômes mous à tendance myxomateus
avait affaire à des organismes déjà débilités par l'inten
naturellement faibles, les hémorrhagies n'ont pas été
séro-sanguinolente ou séreuse qui caractérise ces variét

Le seul et unique avantage reconnu sans contest
femmes traitées, un effet stimulant très favorable à la
ration des forces. Les malades se sentaient, après les
plus alertes, dégagées, en un mot, plus vivantes. Soit
eussent été heureusement influencés, comme innervat
marchaient volontiers et se tenaient aisément debout
avant le traitement. Leurs mouvements étaient
obsédait plus, par son poids ou son contact avec des
bassin était soustraits à cette demi-immobilité forcée,
eurs fonctionnaient avec aisance. En un mot, M. Do
ment les données observées, n'hésite pas à reconnaître
stimulation est assez généralement obtenu par suite de

Il reconnaît, en outre, que cette action porte sur l
proportion assez considérable, pour favoriser le dégag
de moyen volume. Mais les grands myômes, surtout
fond presque avec le tissu utérin environnant, au point
dire s'ils sont énucléables, ne paraissent en aucune faç
qui aurait pour corollaire de les rendre énucléables
spontanée ou artificielle soit vers la muqueuse soit ve
cependant et, théoriquement, il est permis de le suppo

En tout état de causes, l'électrothérapie contre les
palliative infidèle et peu applicable en pratique. S
*inefficacité*, qui n'empêche pas les malades de subir à l
présence de leurs tumeurs. Beaucoup de ces malades
par divers médecins, par le docteur Apostoli entre autres

M. Doléris leur accorde toujours le bénéfice tempor
rimental, avant de recourir à l'intervention chirurgica

En dehors de ces considérations, il en est d'autres sur lesquelles nous ne voulons pas insister, mais qu'il nous suffira de mentionner. Avec la galvano-caustique, les accidents ne sont pas rares: ainsi la *septicémie* est difficile à éviter après un grand nombre de ponctions, et lorsqu'il y a beaucoup de substance mortifiée en permanence dans la matrice, ou au centre de la tumeur. La perforation de la vessie, ou du rectum suivie de fistule, l'ouverture dans la cavité abdominale par perforation de la tumeur elle-même ou d'une trompe suppurée et péritonite consécutive ont été observées et cette fâcheuse éventualité demande la mise en œuvre de grandes précautions opératoires et antiseptiques.

*Médication ocitocique.*—L'action du seigle ergoté et de ses congénères résume cette méthode thérapeutique déjà ancienne et non entièrement abandonnée.—Son efficacité est fort douteuse, au point que lorsque par hasard on a vu l'isolement et la pédiculisation d'un fibrôme se produire à la longue, concurremment avec l'emploi du seigle, par exemple, il est toujours impossible d'affirmer la réalité de l'action de celui-ci, tant le résultat est prolongé, ou semble indépendant de cette action.—Il n'est guère de gynécologue qui n'accepte cela. Quant aux cas où cette médication échoue complétement, ils sont innombrables, car il est peu de femmes affectées d'hémorrhagies dues à des fibrômes qui n'aient commencé leur traitement par l'ergot, l'ergotine ou leurs succédanés.

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# THE NEURAL AND PSYCHO-NEURAL FACTOR IN GYNÆCIC DISEASE.

## LE FACTEUR NÉVRAL ET PSYCHO-NÉVRAL DANS LES MALADIES GYNÉCOLOGIQUES.

## DER NEUROTISCHE UND PSYCHO-NEUROTISCHE FAKTOR IN FRAUENKRANKHEITEN.

BY C. H. HUGHES, M.D.,

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In strictly scientific sense there are no medical specialties. With gynæcologist and neurologist alike, the whole organism, like the firmanent with its stars of every magnitude to the astronomer, is the field for the play of their perceptive and reflective powers. The men who make the heavens their study might have among them a comet astronomer, but his occupation would only be gone and his results to the world quite *nil*, if he studied only comets.

The exigencies of our art in its practical aspects, however, assign us special departments of work and study. The alienist, the neurologist, the gynæcologist, the ophthalmologist, the laryngologist, the otologist, etc., must survey and gather from the whole field, and pigeon-hole for utility in practice, all essential facts that sustain and perfect the special work of each.

With this view of our mutual and interdependent relationship in observation and work, I have accepted the invitation of your distinguished president to present a study, from my standpoint of survey of the common firmament of medical science, of the neural and psycho-neural factors in gynæcic disease.

In the quoted language of one whom Medicine delights to honor, your distinguished president, "The neurological element of gynæcic disease is a very important and much misunderstood factor," not so much, let me add, among the most advanced gynæcologists of our time, as among the many who follow the leaders afar off.

The chief and most important neural factor in the consideration of the diseases of

woman, whether specially and apparently exclusively implicating the uterus or its appendages or not, is the great sympathetic system, with its potential actualities in disease and its morbid possibilities—direct, transmissible and reflex.

The great ganglionic nervous centre, or congeries of nerve-centres and nerve-strands, connecting, afferent and efferent; the double ganglionic chain which hugs, entwines and penetrates the spinal cord, and is interlaced and enchained in physiological and pathological function with the cerebro-spinal axis, so intimately, that in some respects neither physiology nor pathology can yet tell us definitely where the influence of one ends and that of the other begins; this system of nerves and ganglia, with its cerebro-spinal relations, is also so closely and intimately related to the uterine system and special function that it makes possible the truth of the aphorism of French gynæcology in so many of woman's diseases, "*le uterus est le femme.*" The uterus and its associated sympathetic nervous system and the sympathetic system and the uterus, when either or both are implicated, come near being, in fact, in certain morbid states, all there is of the diseases of woman.

This so-called independent, but, with the cerebro-spinal axis, most intimately interrelated nervous system, connects on either side of the spinal column, as we know, with its encased cord, by means of double sets of filaments composed of afferent and efferent fibres passing between each of the sympathetic ganglia and the respective anterior spinal nerves, with which they correspond, as well as with most of the nerves attached to the medulla oblongata.

Ingoing or centripetal impressions may, by means of these fibres, pass on to spinal as well as medullary centres, as well as to the ganglia; and motor or inhibitory impressions may be sent outward from cerebro-spinal centres so as to modify subordinate motor or secretory influences emanating from one or other of the sympathetic ganglia. An afferent and efferent exchange and interchange of impressions and influence takes place between the ganglionic centres of the sympathetic system and the motor and sensory centres of the cerebro-spinal axis, shown largely in secondary vasomotor and nutritive influences and secondary vascular changes in cord, in brain, in ganglionic centre.

"From the ganglionic cord on each side of the spinal column, numerous internal branches are also given off, which unite with one another, with those of the opposite side, and often with filaments of the pneumogastric nerves, so as to form great plexuses, with or without well-marked ganglia, with which the various glandular organs and hollow viscera of the body are in connection by means of afferent and efferent fibres."

The sympathetic nerves usually accompany the blood vessels, and have special sets of fibres with vasomotor and vaso-constrictor functions, in subordinate relation to spinal vasomotor centres along the whole length of the cord, dominated by a higher centre in the medulla below the fourth ventricle, and probably higher up in the cerebral cortex, about the hippocampus major.

The sympathetic nervous system is an almost omnipresent anatomical factor, and almost ubiquitous where there is visceral, vascular or glandular function. It is with the fœtus in utero and the organ that encases it and the placenta that nourishes it, and upon its integrity depends not only the healthy evolution of the intramural germ of life, but the life of the mother; the relationship of fœtus and mother have their physiological ending, and the after-birth, having filled its mission, must come away, leaving fatally bleeding or securely closed vessels behind, according to the integrity or otherwise of this important neural mechanism.

We may doubt the existence of trophic nerve-fibres or centres belonging to the sympathetic system, a fact I would not dare to deny, in view of what we certainly know of the conservative power of this wonderfully conservative mechanism of the human economy, but there is no longer room for doubt of the vaso-control of this system of nerve-influence over the calibre of arteriole walls.

We have in the sympathetic nervous system a system of nerves which influences circulation, controls the muscular movement of involuntary organs and affects nutrition. The activity of all the glandular organs, the movements of the hollow viscera and gland ducts, and the nutrition of the tissues depend upon its integrity. To its influence the uterus is no exception. On the contrary, it and its appendages and special functions are most intimately related to this neural mechanism, a mechanism which, to the human system, is what the law of gravitation is to the planetary. It holds the organs in their proper functional place, and maintains the equilibrium of the viscera, pelvic as well as abdominal, their special and inter-related movements, as certainly and as surely as the planets are held in their orbits. It contracts a uterus as it does a pupil. In its integrity it keeps hyperæmia and inflammation at bay. It is the omnipotent physiological hand of the organism in whose clasped or relaxed grip is held the issues of disease and death, or abnormal function and death. It is more or less deranged, locally or generally, in every form of disease. It is the presiding genius of evil in all morbid movement, either alone or influenced by its connections with the spinal cord or brain.

This is not an overdrawn picture, but has just warrant for every word in what is proven of its relations and power over health and disease.

While it is in the spinal cord and brain that we meet with those special symptom groupings which have, by common consent, been referred to and described as referable to disorder of the sympathetic system, the pelvic viscera are no exception to its influence. The organs of generation are subject alike to this influence with all other parts of the body.

Its expulsive power, when intramural foes disturb it, as blood clots, or maternal placenta or fœtus; its contractile power over the smaller non-striated muscles, as when a threatened hemorrhage is arrested. Its contraction, when the mouth is too long and too violently dilated or its internal fundus irritated under certain circumstances, show us what a friend or foe in the combating of disease this wonderful sympathetic system is; how important is the neural factor in gynæcological procedure, to the well or ill being of the patient.

Like that omnipotent Providence which looks over and cares for the small boy without the small boy knowing it, the sympathetic system is always with the gynæcologist, helping him out without his always knowing; whether by rapid dilation of the os tincæ he excites a vasomotor centre and suppresses an excessive catamenia, or by moderate utero-oral stimulation he accelerates a tardy flow; whether by vaginal tampon or astringent injection, or a successful galvanic treatment, he constringes the overladen pelvic vessels, or whether by manual dexterity and these means combined the undue pressure of a retroflected uterus is removed from suffering and congested hemorrhoidal vessels and nerves, the effect is finally, through the neural or neuro-vascular mechanism, and the gynæcologist who despises not the influence of this vital mechanism, before as well as after the employment of his special means of relief, is wise.

Hitherto the nervous system has been too much ignored by gynæcology; and it is encouraging to hear sensible gynæcologists say, as Goodell confesses, in his recent meritorious work, that too often disease of the nervous system has been mistaken for uterine disease.

This wondrous system and its allied cerebro-spinal connections has to do, more than the uterus alone, with the fate of woman in gynæcological hands.

The gynæcic diseases of woman are largely neural. They are also, it is obvious, even from this cursory glance at her organism and its inter-related cerebro-spinal and ganglionic system, both neural and psycho-neural, as well as simply gynæcic.

If man is a bundle of nerves, as he has been defined, woman is a similar bundle *plus* a uterus and its appendages, and this uterus is itself a bundle of nerves. If we study woman and her special diseases in this light, we shall better comprehend her than

if we study only her diseases as limited to the uterus alone. And woman will better understand herself if she is taught that there is much more of her than the uterus and its appendages to become diseased. The womb disease crank among our patients, who is the bane alike of enlightened neurology and gynæcology, will then disappear.

If we consider for a moment how large a proportion of the diseases of the nervous system, other than the structural diseases of the cord and brain, is due to derangement of the sympathetic nervous system, indisputably in their symptomatic expression, if not in their ultimate pathology, we are prepared to concede, *a priori*, the very significant part played in uterine disorder by this important mechanism.

Epilepsy, convulsions, migraine, exophthalmic goitre, unilateral hyperidrosis, progressive facial hemiatrophy, angina pectoris, asthma, diabetes, Addison's disease, gastralgia, enteralgia, neuralgia trifacialis, neuralgia cœliaca, neuralgia spermatica, ovaralgia, etc. (Eulenberg, Guttman, Bastian), cholera nostras, Asiatic cholera, are either wholly or in part dependent on disorder of this system, not to mention other affections of the nervous system less completely related to the sympathetic, such as progressive muscular atrophy, psuedo-hypertrophic muscular paralysis, diphtheritic paralysis, reflex paralysis, neuro-retinitis and glaucoma.

These latter-named affections are but partially and remotely related to the sympathetic nervous system, but they would make far different and less significant and complete a symptomatic showing if it were not for the part played in their symptomatic expression by the sympathetic nervous system.

Bearing these facts in mind, and especially the relation of the sympathetic system to the vascular, let us turn briefly to that most important of the special functions of the female economy, menstruation, and take a neurological as well as hysterological view of its disorders and their successful management.

I will not discuss the question at length whether menstruation is a physiological secretion or simply a sanguineous or sero-sanguineous, or serous or serous-mucous exudate, though I believe it to be a mixed exudative discharge, as such a discharge must be, from its location and the membrane through which it passes, and which for a time holds (mixed with the disintegrated and degenerative mucous membrane of the uterus) the decidua menstrualis, if you please to so term it.

It has, nevertheless, vascular conditions behind it, a vasomotor system, afferent, efferent, and centres, which, when the intramural peripheral change is complete, close the flood-gates, and hold them securely closed, till another cycle of intramural peripheral change comes round in the wonderful economy of woman's sexual system.

This vasomotor mechanism plays as important a part here as it does in permitting or arresting leucorrhœa, a condition, which, as Legros and Onimus more than twenty years ago suggested, can be readily relieved by dorso-pelvic galvanization, a hint which gynæcology, though tardy in putting to practical account, is now profitably using through Apostoli's and Engelmann's methods.

The derangements of menstruation are usually catalogued by accepted writers as consisting chiefly of—

Amenorrhœa, Dysmenorrhœa, Menorrhagia.

The first condition, when the ovaries are not absent, imperfectly developed, atrophied or otherwise markedly diseased, depends, by common consent of gynæcological authority, on what are called conditions of the general health. The blood is said to be deteriorated and nutrition is below par, and emotion, fright or grief, cold, heat, a sudden shock, psychical or physical, to the system may arrest the catamenial discharge at any time.

The psychical causes here enumerated, every one will concede, go downward from the cortex and medullary centres, on down the ganglionic chain, until the sympathetic centre having most to do with the catamenial flow is reached, and arrest and suppression

follow. In the same manner the shock of an intensely cold or hot pediluvium passes upward and arrests the flow; just so a hot or cold vaginal douche at an opportune time, or the galvanic current, may, by constringing the open mouths of the menstruating vessels, put a sudden stop to their functions.*

Now, the blood may be deteriorated in amenorrhœa, the innervation of the cardiac ganglia may fail in consequence, the blood may lose its stimulating power to excite powerful cardiac contractions, the heart's systole may become feeble and the *vis a tergo* become inadequate to propel the blood everywhere with sufficient force, and the catamenia may fail to appear from this cause; but another cause of amenorrhœa in young females is an inherent neuropathic degeneracy, as the neurologist sees these persons, in which ancestral nerve overstrain, sexual or otherwise, has existed, or an acquired neuropathic decadence, of which habitual neuratrophia and sequent neurasthenia are the prominent symptoms.

Certain mechanical conditions causing atresia of the genital canal are conceded and need not be discussed; others are possible only through nerve apathies and the failure of the uterine walls to contract and expel slight obstructions.

This apathy is afferent nerve insensibility or central motor atonicity. This is corrected, through the advice of gynæcologist and neurologist alike, when the patient is advised to restore her constitutional vigor by change of air, exercise in the open air, agreeable mental diversion, nourishing diet, electricity and tonics.

Here are two kinds of neurotic—vasomotor—dysmenorrhœa, which I take from a recent lecture by Goodell, the indirect neurotic beginning in the uterus; the other, primarily neurotic, beginning in the brain. I give them with Dr. Goodell's comments. Both were sent to him for ovariotomy, if necessary. Both recovered without it :—

"A patient with excessive ovarian pain, with terrible dysmenorrhœa, and reduced to skin and bone. She had been bed-ridden for two years, and was unable to sleep or eat. I suggested to her physician, who accompanied her, that it would be best, in the first place, to relieve the stenosis and cure the dysmenorrhœa. The left ovary was also lower than normal. There was, however, no history of pelvic peritonitis, or of organic disease of the ovary. The constant congestion was sufficient to account for displacement of the ovary. The decision was that she was placed under my care, and she came to this city. I dilated the cervix and put her on the 'rest treatment,' with massage and electricity. At the next period the dysmenorrhœa was excessive, for the uterus had not recovered from the bruises produced by the operation. The next period was better, and after this she continued to improve, and before long began to walk. Last week I received from her husband a most grateful letter. In these cases the symptoms point so distinctly to the ovaries as the seat of the disease that unless you are on your guard you will be deceived. *Any woman subjected to great mental trouble is liable to manifest symptoms referable to the ovaries.*

"A young girl for six months nursed her father, who was suffering with cancer of the lip. After his death she broke down and presented very exciting symptoms of uterine and ovarian trouble. She came to me to have a good diagnosis made by her physician

* "We must appreciate that in no other part of the body have we such a matted network of vessels in the same space. In consequence of the erectile character of all the tissues, these vessels become varicose from any continued obstruction to the circulation, and have an almost incredible venous capacity. As a stream of water will saturate the ground and lose itself in a marsh, so will the circulation through the pelvic cellular tissue become, in disease, equally sluggish. . . . In this over-distended condition of the veins the balance is lost, and they are no longer able to return to the general circulation the quantity of blood received by them from the arterial capillaries. . . . Unless we can control the pelvic circulation, and at least impart a temporary tone to these vessels, it will be found in the end that little has been accomplished."—T. Addis Emmet, on the philosophy of uterine disease, *New York Medical Journal*, July, 1874.

reversed. He had told her that the whole trouble was due to nervous prostration, and I fully confirmed his opinion. Sometimes I err on the conservative side, yet all these cases are, in a measure, improved by the 'rest treatment,' and, if necessary, the operation can be performed subsequently."

In the first of these cases, as in the second, the dilatation of the os might have been omitted without jeopardy to the patient's cure, yet, I believe, the operation of divulsion, for neurological reasons, has its benefits, chiefly through the contractile tonicity of transmitted peripheral excitation over the vasomotor neural mechanism of the pelvic viscera.

The *malaise* and general discomfort, languor, lassitude, headache and backache, which so many women have during menstruation, are all nervous disturbances, and the pain of dysmenorrhœa is likewise, whether congestive or inflammatory, neuralgic, spasmodic or ovarian, and secondarily, in mechanical dysmenorrhœa.

But mechanical dysmenorrhœa is less frequent than is commonly supposed; else why do opinions differ so much in regard to the seat of obstruction? Why does Barnes believe it to be usually seated in the os tincæ and accompanied by conical cervix; Graily Hewitt, an obstructed flexion, and Sims place it in the os internum?

A pin-hole orifice may permit a fatal hemorrhage, and flexion must be at an exceedingly acute angle to prevent this wide a passage. It might be possible in a retroflexion with an impacted rectum and coagula in the fundus uteri.

At all events, as it is not our special province to discuss this point further, we may say a very narrow canal would permit of painless menstruation, if all parts of the uterus are healthy. To have painful menstruation in an otherwise healthy uterus, we must have exalted nerve sensibility—uterine hyperæsthesia. Either this, if the neural factor attract our attention through the patient's pain, or such internal abrasions as expose sensory nerve-areas; the disintegrated decidua may contain fragments of exfoliated uterine surface and the exposed nerves may be mutilated by these masses or clots. In either case, or both, the sensory and the ganglionic nervous systems demand our attention. In treatment the bromides and the other nervous sedatives, hyoscyamus, conium, gelsemium, belladonna, cannabis indica, galvanism, etc., with or without local interference.

The neuralgic and spasmodic and special ovarian varieties of dysmenorrhœa call still more especially and imperatively for neurotic treatment, for obvious reasons. Of the recognized varieties of dysmenorrhœa, the membranous, the local inflammatory and the purely mechanical may be said to belong exclusively to the gynæcologist. The other forms fall often under the eye of the neurologist, and are treated by him incidentally; but to understand well and differentiate the proper treatment the gynæcologist should be something of a neurologist, and the neurologist something of a gynæcologist; or, better, they should take counsel of each other and reason together of the cause, relation and course of treatment. These specialties cannot well be divorced when women's diseases are to be considered. They are as clearly related in practice, often, as are the nervous and uterine systems of woman.

Ovarian dysmenorrhœa and its antecedents and sequences has a peculiar fascination for the neurologist; for, associated with it he can often trace the morbid implication of ganglion after ganglion in the chain of sympathetic disease, and see the whole system, as it were, successively traversed by this vicious chain. A wave of psychical irritation, beginning in a sympathetic centre of the cerebral cortex, traverses downward to the medulla, and further down to the cardiac ganglia, or down to the abdominal and pelvic, and the successive phenomena of hysteria and disturbed catamenia appear, or an ovarian congestion with ovaralgia leaps from ganglion to ganglion till these phenomena appear in reverse order. A similar order of progression may be observed in far graver maladies and proceed from or to the testicles in man. It is through the great sympathetic and its interwoven and cerebro-spinal connections that gentle, firm pressure on an ovary or a

testicle may arrest violent nervous phenomena; that supra-orbital nerve pressure may sometimes do it; that strong peripheral irritations and violent mental emotions or strong cerebral impression, like hypnotism, may do the same thing.

Emmet, whether pioneering the hot vaginal douche in uterine therapeutics or tamponing the vagina, seeks to restore physiological control of uterine vascular states, both by local and constitutional means, and this mainly done and permanently maintained through the vasomotor system.

These cursory intimations suffice to remind us that the nervous system is no insignificant factor in the consideration of the phenomena, relationship and successful management of gynæcic diseases. The field is too vast for an exhaustive dissertation on such an occasion as this, and we lack both time and ability for the task.

If this brief and hasty survey shall lead others further on to richer finds the present prospector will be amply repaid for this hour's effort.

We venture, in conclusion, to offer the following as the legitimate result of combined gynæcological, neurological and general study of woman in relation to her diseases.

Modern gynæcology, enlightened by past and present researches, comprehends the study of the whole organism of woman. Her neural organism and psycho-neural functions are so intimately related to her gynæcic functions as to make it impossible to intelligently study and comprehend many of her special diseases without taking just account of the influence and relations of her cerebro-spinal and ganglionic mechanism and its functions, as well as of her distinguishing pelvic organs and of their special, exclusive and peculiar function.

Neither the gynæcologist nor the neurologist can learn his local part well in practice, any more than the actor on the stage, by studying his part alone and exclusively, without reference to its relation to the others.

The successful study and consequent mastery of any disease requires a more or less comprehensive understanding of its intra-organic, as well as its extra-organic environment.

To be successful physicians in any department of medical skill we must make the whole patient as well as the part engaging our special remedial attention, the subject of our investigation.

Dr. Graily Hewitt, of London, on the part of the Foreign Delegates, and Dr. E. H. Trenholme, of Montreal, for the Dominion, tendered votes of thanks to the officers of the Section for the uniform courtesy and attention shown, accompanying them with happy congratulatory speeches upon the success of the Congress and of the work in the Section. These were adopted by a rising vote.

The President, Dr. Marcy, in closing the session said:—

Gentlemen of the Section—

There remains but little to be said at the close of our long, arduous and earnest labors. I have to thank you for your kindly sympathy and courteous aid in the position assigned to me in presiding over your councils. While I esteemed it a very great honor, I accepted the trust with fear mingled with hope; fear lest my imperfect services would not be equal to the occasion, hope, that the occasion itself would so overshadow the individual that we might escape too severe scrutiny. The anxiety of months is at an end, and my sole desire, as to how I could best serve this Congress, has found gratification in your kindly sympathy and support. To you I owe my thanks, too heartfelt for expression, and the many loving acquaintances here formed I shall treasure to my latest days.

Farewell words are ever spoken with pain. May the separation to each of you be cheered by kindly remembrances and brightened by hope of other meeting, rendered doubly precious by the reminiscences of the present.

# INDEX TO VOLUME II.


Abdomen, gunshot wounds penetrating, 5, 187, 194.
surgery of, point in, 826.
wounds of, penetrating, 200.
Abdominal section, for removal of fœtus, 372.
Acclimation of Europeans in hot climates, 113.
Acclimatization and age of soldiers, 3, 99.
Accouchement, typhoid fever in, 414.
Address of Dr. E. A. Wood, 6.
by President of Sec. III (Dr. H. H. Smith), 2.
by President of Sec. IV (Dr. DeLaskie Miller), 302.
by President of Sec. V (Dr. H. O. Marcy), 510.
Air, sterilized, in laparotomy, 880.
Alexander, Dr. Wm., 742.
Alexander's operation in uterine displacements, 764.
Allen, Dr. Nathan, 511.
Amaurosis, puerperal, uræmic, 501.
Amputation for injury of living parts, 281.
in gunshot wounds in field 9, 284.
Analysis of water in field, 2.
Anatomy, morbid, of endometritis, 849.
Anderson, Dr. John, 3, 107, 113.
Antisepsis in war, 4, 120, 123.
Apostoli, Dr. G., 654, 701.
Ashdale, Dr. Wm. J., 573.
Asphyxia in newly born, relief of, 469.
Atmosphere, relation of, to puerperal fever, 390.

Balls-Headley, Dr., 375, 571, 738.
Bandl, Dr. Ludwig, 329.
Bartlett, Dr. John, 321, 438.
Bavarian, dressing, 6, 268.
Beidler, Dr. H. H., 10, 290.
Bently, E., Surgeon, U. S. A., 5, 206.
Bigelow, Dr. H. R., 575.
Boislinière, Dr. L. C. H., 415.
Bond, Dr. Y. H., 573.
Bontecou, Dr. R. B., 4, 5, 6, 9, 10, 184, 245, 271, 272, 290, 300.
Bontecou's soldiers' packet dressing, 134.
Bozeman, Dr. Nathan, 514, 697, 707, 717.
Brown, Dr. Chas. W., 5, 246.
Browning, Dr. Wm., 253.
Bryant, Prof. Jos. D., 4, 5, 180, 200, 207.
Burns, Dr. B., 573, 830.
Burton, J. E., M. R. C. S., 722.
Butte, Dr. Lucien, 339.
Buvinger, Dr. C. W., 4, 5, 184, 223.
Byford, Dr. H. T., 496.

Cæsarean operation, 362.
operations, prognosis in, 356.
Cameron, Dr. James C., 330, 420, 468.
Cancer, hysterectomy of, 805.
of uterus, 782, 793.
Carcinoma of uterus, extirpation of, 788.
Carnochan, Professor, 4, 139.
Carstens, Dr. J. H., 463.
Castration, 722.
Cervix uteri, cancerous glands of, 777.
dilatation of, 567.
lacerations of, 872.
treatment of, in pregnancy, 378.
Charpentier, Dr. A., 314, 339.
Christian, Dr. E. P., 456.
Clark, Dr. S. T., 5, 245.
Clarke, Dr. A. P., 571, 739, 773, 816, 846.
Collins, Dr. James, 3, 10, 72, 112, 290.
Contractions of uterus in pregnancy, value of in diagnosis, 310.
Cook, Dr. J. L., 430.
Cordes, Dr. A., 564, 782, 815.
Cullen, Dr. J. S. D., 4, 137.
Curette, use in puerperal fever, 399.
Cushing, Dr., 558, 777.
Cutter, Dr. E., 689, 701, 702, 804.
Dr. John A., 702.
Cystitis in women, 702.

Degeneration, cancerous, cervix uteri, 777, 781.
Deventer, method of delivery of head, 438.
Didama, Dr. Henry, 5, 8, 245, 653.
Dirner, Dr. G. A., 801.
Diseases and wounds, statistical report of, 229
Doléris, Dr. J. A., 377, 420, 774.
Douche uterine in puerperal fever, 399.
Drainage in fistulæ and pyelitis, 514.
Dressing, antiseptic, in gynæcic surgery, 863.
Bavarian, for fractures, etc., 6.
for gunshot fractures in transportation, 6, 265.
in field for soldier, 116.
packet, 134.
Dudley, Dr. A. P., 802, 805.
Dunlap, Dr. A., 707, 845.
Dunmire, Dr. G. B., 463.
Dysentery and diarrhœa, camp, treatment of, 5, 223.
Dystocia, 481.

Earle, Dr. Charles Warrington, 310, 337, 399.
Eclampsia, puerperal, 470.
Electricity in diseases of uterus, 661.
tumors of female breast, 685.
uterine fibroids, 669.
Electrolysis in uterine fibroids, 688.
Eliot, Dr. Gustavus, 468.
Emmenagogue, uterine stem as, 867.
Endometritis, morbid, anatomy of, 849.

Entrikin, Dr. F. W., 845.
Ergot in uterine fibroids, 594.
Erysipelas, causes and treatment, 5, 207.
Esmarch, Professor, 133.
Europeans, acclimation of, in hot climates, 113.
Explosive balls, international laws against, 3, 91, 94.

Faison, Dr. I. W., 570.
Faradic currents in gynæcology, 654.
Farkas, Dr. L. von, 4, 183.
Femur, gunshot fractures of, 6, 256.
Fever, puerperal, atmosphere in, 390.
causes and treatment of, 399.
prevention and treatment of, 394.
typhoid, supervening on accouchement, 414.
typhus, in camps, etc., in civil war, 10.
Field dressing in war, 116.
hospitals, construction of, 3, 72.
Fistula, vesico-vaginal, 815.
Fistulæ, urinary and fœtal, in women, treatment of, by drainage, 514.
Fitch, Dr. Simon, 721.
Fœtus, for removal of, 372.
maternal, impressions on, 432.
uræmia, influence of, 339.
Forceps, delivery of head by, 323.
improved, 328.
Fort Ringgold, Texas, tables of miasmatic diseases, etc., 30.
Fractures, Bavarian dressing in, 268.
gunshot, transportation in, 265.

Galvanism in uterine fibroids, 689.
Gangrene, hospital, 5.
during war, 220.
Garnett, Dr. A. Y. P., 575.
Garratt, Dr. A. C., 685, 701, 702.
Gaston, Prof. J. McF., 5, 7, 10, 253, 289.
Geographical and social peculiarities, influence of, on military medical service of U. S. 2, 11.
Geographical peculiarities, 11.
Getz, Dr. H. L., 717.
Glisan, Dr. Rodney, 321, 424, 450, 467.
Goelet, Dr. A. H., 570, 573.
Goodman, Dr. H. Ernest, 112, 281.
Gordon, Dr., 568, 593, 776.
Gori, Dr. M. W. C., 120.
Gouley, Dr. J. W. S., 5, 233.
Gregory, Prof. E. H., 185, 281.
Griswold, Dr. E., 5, 9, 10, 186, 284, 289, 290.
Guadendorff, Herman, 136.
Gunshot fracture, amputation in, on the field, 9.
dressing in, for transportation, 6.
lower limbs, transportation in, 265.
of femur, 6, 262, 256.
wounds, abdomen, penetrating, non-fatal, 4.
abdomen, penetrating, treatment of, 5, 187, 194.
in field, amputation in, 284.
joints, 4, 174.
primary treatment of, 140.
resection or excision, 9.
resection or excision, in war, 272.
treatment of, 4.
Gynæcic disease, neural and psycho-neural factors in, 903.
Gynæcology, Sec. V., 509.
conservative, 575.
Faradic currents in, 654.

Hamilton, Dr. Jno. B., Secretary-General, 302.
Harvard, Surgeon V., U. S. Army, 3, 52.
Head, delivery of, Deventer's method, 438.
Heat-stroke in India, 3, 107.
Hemenway, Dr. H. B., 480.
Hemorrhage, post-partum, prevention of, 476.
uterine, internal, 431.
Hewitt, Dr. Graily, 418, 430, 570, 591, 730, 804, 909.
Hewson, Dr. A., 826, 845.
Hicks, Dr. J. Braxton, 310.
Hingston, Dr., 5, 245.
Hoff, Dr. J. W., 572.
Hospital and other huts, etc., 3, 65.
gangrene, 220.
wards, use in war, 88.
Hospitals, field, construction of, 3, 72.
military, temporary, 4.
stationary and movable, in war, 3, 81.
Hughes, Dr. C. H., 903.
Hyde, Dr. F., 2, 5, 170, 245.
Hygienic surroundings at military posts, 2.
Hysterectomy, vaginal, 805.

Increase, law of, 511.
India, heat-stroke in, 3, 107.
Injuries, etc., resection or excision, in war, 272.
Injuries of joints, penetrating, 174.
Injury, amputation in, 6.
living parts, amputation for, 281.
Insanity, utero-ovarian, 877.
International regulations for treatment of sick in war, 150.

Jackson, Dr. A. R., 571, 793, 804.
Jaggard, Dr. W. W., 323, 376, 394, 419, 475.
Janes, Dr. Henry, 4, 5, 6, 18, 184, 187, 256, 261.
Johnson, Dr. Jos. Taber, 774, 845.
Joints, penetrating injuries of, 4, 174.
wounds of, penetrating, 4, 170, 180.
Jones, Dr. Geo. W., 421, 445, 468, 475, 481.
Jno. W., 863.

Kellogg, Dr. J. H., 697, 764.
Kelly, Dr. J. E., 451.
Kimball, Dr. Gilman, 700.
King, Dr. A. F. A., 313, 356, 446, 464, 468, 474, 489.
Dr. James K., 698, 781.
Kucher, Dr. Joseph, 362, 390.

Lamb, Dr. D. S., U. S. Army, 3, 4, 150.
Lane, Dr. T. G., 473.
Langridge, Dr. Geo. T., 4, 104, 111, 183.
Laparotomy, sterilized air in, 880.
Lawrence, Dr. A. E. A., 468, 474, 573, 592.
Lazarewitch, Dr. T., 323.
Lefebvre, Dr. Gustav, 113.
Leishman, Prof. Wm., 389.
Lemoyne, Dr., 5, 186.
Leonard, Dr. C. H., 572.
Lester, Dr. E., 462.
Leukæmia, influence of on pregnancy, 330.
Lithiasis, influence of on pregnancy, 451.

Longmore, Sir Thomas, 116, 1 33.
Lowell, Dr. G. K., 717.
Loyd, W. H., Surgeon British Navy, 2, 6, 8, 29, 111.
Lusk, Dr. Wm. T., 356.

Marcy, Dr. Henry O., 490, 510, 835, 847, 909.
Martin, Dr. A., 376, 468, 569, 788, 804, 805.
F. H., 669, 698.
Marston, Dr. Jeffrey A., 99.
J. A., Deputy Surgeon-General, 2, 3, 6, 8, 28, 65, 110, 185.
McCallum, Dr. Duncan C., 315, 473.
McDonald, Surgeon J. D., 2, 47.
Meatus urinarius, female, growth of, 816.
Medicine, surgery, military and naval, 1.
Membranes, relation of, in parturition, 496.
Menstruation, vicarious, 315.
Mergler, Prof. Marie J., 338.
Metritis, chronic, 717.
Meyer, Dr. Leopold, 849.
Miasmatic diseases, etc., tables of, 30.
Microörganisms in uterine myomata, 830.
Military posts, examination of water at, 2, 22.
Miller, Dr. DeLaskie, address of, 302.
330, 375, 422, 464.
J. P., 871.
Montgomery, Dr. E. E., 846, 872.
Moore, Dr. T. J., 5, 194.
More-Madden, Dr. Thos., 394, 558, 872.
Morton, Dr. Thos. G., 5, 204.
Murphy, Dr. P. J., 413.
Myoma, uterine, extirpation of, 834, 835.

Nelson, Dr. Daniel T., 322, 397, 573, 594, 653.
S. N., 830.
Neudörfer, Dr. J., 3, 4, 81, 123, 161.
Neural factors in gynæcic disease, 903.
Nomenclature, obstetrical, 346, 465.
Norbury, Dr. Henry F., C. B., 3, 52.
Nosography, human, 5, 233.
Nowlin, Dr. J. B. W., 877.
Nunn, Dr. R. J., 803.

Oatman, Dr. Ira E., 321, 420, 470.
Obstetrical nomenclature, 346, 465.
Obstetrics, Sec. IV, officers, list of, 301.
conservative, 424.
labor, third stage, treatment of, 424.
removal of secundines after abortion, 424.
Obturations, progressive, 564.
O'Hara, Dr. M., 727.
Opie, Dr. Thos., 328, 389.
Os uteri, rigidity of, dystocia from, 481.
Ovariotomy, revival of in the West, 707.

Packet dressing, 134.
Parkes, Dr. Chas. T., 445.
Parturition, relation of membranes to, 496.
Pattee, Dr. A. F., 848.
Peabody, Dr. J. H., 6, 263.
Pearce, Dr. Enoch, 463, 473, 480.
Perineum, plastic operations on, 864.
Peritonitis, purgation in, 774.
Phlegmasia alba dolens, 415.
Placental development, 490.
Porter, Dr. G. L., U. S. A., 4, 139, 174.
Positions, occipito-posterior, treatment of, 498.



Poussié, Dr. Emile, 414.
Pregnancy, diagnosis of, 446.
extra uterine, 727.
influence of on lithiasis, 451.
post-partum, hemorrhage in, 476.
retroflection in, 446.
uterine fibroids in, 583.
Prince, Dr. David, 880.
Prisoners of war, treatment of, 4,
Puerperal fever, causes and treatment of, 399.
prevention and treatment of, 394.
prevention of, 406.
relation of atmosphere to, 390.
Puerperal uræmic amaurosis, 501.
Purcell, Dr. F. A., 805.
Purgation in peritonitis, 774.
Pyelitis, treatment of, 514.

Ration, best for soldier, 2, 33.
Reed, Dr. C. R., 570, 653, 845, 867.
Regulations, international, for treatment of sick in war, 150.
Reid, Dr. Wm. L., 757.
Report, form of, sick and wounded, 5.
of diseases, etc., statistical, 229.
Resection or excision in gunshot wounds, 9.
Resolutions to Dr. H. H. Smith, 7.
Reyburn, Prof. Robt., 3, 5, 91, 185, 186, 261.
"Rifles" Hall (Sec. Military and Naval Surgery), 2.
Roberts, Dr. Lloyd, 419, 468, 801.
Robinson, Dr. W. L., 463.
Round ligaments, shortening of, 742, 757.

Sale, Dr. E. P., 463, 476.
Sanders, Dr., 5.
Sänger, Dr. M., 362.
Secretaries of Sec. III, 10.
Secretary-General Jno. B. Hamilton, 302.
Section III, Military and Naval Surgery, officers, list of, 1.
Minutes of, 2.
IV, minutes of, 302.
Obstetrics, officers, list of, 301.
V, Gynæcology, officers, list of, 509.
Semeleder, Dr. F., 688.
Sherwood, Dr. T. H., 111.
Sibbet, Dr. R. L., 406, 423.
Simpson, Dr. A. R., 313, 346, 356, 479.
Professor, 375, 414, 418, 445, 473, 495.
Smart, Surgeon Chas., U. S. Army, 10, 291.
Smith, Dr. A. L., 574, 661, 698.
H. H. 1, 2, 3, 5, 6, 8, 11, 206, 271.
Joseph R., Surgeon U. S. Army, 2, 5, 6, 7, 29, 33, 136, 206, 229, 271.
Social and geographical peculiarities, influence of on U. S. Military Medical Service, 11.
characteristics, 13.
Soldier, best ration for, 2, 33.
dressing for wounds, in field, 116.
Soldiers, age and acclimatization of, 399.
Spanton, W. D., F.R.C.S., 702.
Staples, Dr. Francis Patrick, 21.
Fred'k, 2.
Statistics, vital, in Army and Navy, 4, 147.
Stem, intra-uterine as an emmenagogue, 867.
Sterility in women, treatment of, 558.
Stern, Dr., 5.

Stern, Dr. Max, 6, 112, 271.
Stewart, Dr. J. L., 4.
Wm. S., 328, 418, 446, 464.
Still-birth, rate and causes, 456.
Stretchers and stretcher drill, 3, 52.
slings, 2, 47.
Stout, Dr. S. H., 4, 64, 88.
Stringer, Dr. Sheldon, 469.
Suetin, Dr., 6.
Surgery, abdominal, point in, 826.
conservative, in warfare, 161.
Military and Naval, officers, list of, 1.
Suture, buried, in vesico-vaginal fistula, 815.

Table of gunshot fractures of femur, 262.
shot wounds, 179.
Tables, mortality, 105.
of miasmatic diseases, etc., Fort Ringgold, Texas, 30.
Taylor, Dr. Morse K., U. S. Army, 2, 3, 22, 104, 111.
Taylor, Dr. Wm. T., 432.
Temple, Dr. J. A., 498.
Testimonial to Dr. H. H. Smith, President of Sec. III, 6.
Tetanus, etiology and treatment of, 5, 246.
Tobin, Surgeon Richard Francis, 6, 265.
Transportation of wounded, 64.
Treille, Dr., 118.
Trenholme, Dr. Edw. H., 431, 573, 592, 773, 834, 845, 909.
Tumors of breast, removal of by electricity, 685.
Typhus fever in camps, etc, in civil war, 10, 291.

Uræmia, influence on fœtus, 339.
Uterine displacements, Alexander's operation in, 764.
shortening of round ligaments in, 742, 757.
fibroids, electricity in 669.
electrolysis in, 688.
ergot in, 594.
galvanism in, 689.
in pregnancy, 583.
fibromata, therapeutics of, 892.
hemorrhage, internal, 431.
intra-, examination, 721.
myomata, microörganisms in, 830.
stem, as an emmenagogue, 867.
Uterus bilocularis, 830.
cancer of, 782, 793.
changes in tissues and shape of, 730.
Uterus, contractions of the, in pregnancy, value of in diagnosis, 310.
dilatation of, 564.
cervix, 567.
displacement of, 740.
electricity in diseases of, 661.
extirpation of in myoma, 834.
lacerations of cervix, 872.
vaginal extirpation of, 788.

Vaginal examination, 721.
Varian, Dr. Wm., 3, 4, 5, 139, 207, 220.
Vesico-vaginal fistula, buried, suture in, 815.
Viet, Dr. D. J., 864.
Villa, Dr. D. Angel, 892.
Vital statistics in Army and Navy, 4, 147.
Voorhees, Dr. C. H., 3, 94.
Vuillet, Dr., 564, 815.

Wade, Dr. De Witt C., 740.
War, antisepsis in, 120, 123.
Wards, hospital, use in war, 88.
Water analysis in field, 2, 21.
examination of, at military posts, 2, 22.
Wathen, Dr. Wm. H., 372, 467, 567, 574.
Watson, Dr. B. A., 2, 4, 140.
Dr. David, 846.
Weeks, Dr. S. H., 569, 583.
Wells, Dr. B. H., 489.
Williams, Dr. P. C., 450.
Wilson, Doctor, 185.
Wilson, Dr. John H., 501.
Wood, Prof. E. A., 4, 5, 6, 10, 111, 147, 186, 289.
Wound dressing, soldier's packet for, 134.
Wounded, transportation of, 64.
Wounds, abdomen, penetrating, 200.
antiseptic dressing of, in gynæcic surgery, 4, 863.
from explosive balls, international laws against, 3, 91, 94.
gunshot, abdomen, penetrating, 5, 194.
abdomen, penetrating, treatment of, 5, 187, 194.
joints, 4.
primary treatment of, 140.
resection or excision, in war, 272.
treatment of, 4.
of joints, penetrating, 4, 180.
treatment of, 170.

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